THE GAS JOURNAL

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A Glance at the Contents—

The Domestic Smoke Problem.

The possibilities of coke oven fuel as an aid in the solution of the domestic smoke problem are reviewed by Mr. R. A. Mott, M.Sc., F.I.C., in a paper which he read before the National Smoke Abatement Society at Newcastle-upon-Tyne on Sept. 24 last. [p. 700.]

B.C.G.A.

The twenty-first annual report of the General Committee of the British Commercial Gas Association is a record of excellent work accomplished during a most difficult period. Notwithstanding the national economic crisis during the financial year under review—viz., to March 31 last—the Association's total income shows a gratifying increase. [p. 694.]

Building Exhibition.

Supplementary to our account of the Building Exhibition at Olympia in last week's "JOURNAL" we publish to-day photographs of some of the exhibits, which will give an idea of the excellent lay-out of the stands and of the part which the Gas Industry played during the successful run of the exhibition, which comes to an end to-day. [p. 693.]

Gas for Trade and Industrial Purposes.

In a paper which he read before the Wales and Monmouthshire Association of Gas Engineers and Managers at their meeting at Porthcawl on Sept. 22, Mr. H. D. Madden, M.Inst.C.E., M.I.Mech.E., Engineer and Manager of the Cardiff Gas Light and Coke Company, dealt with the subject of the development of town gas for trade and industrial purposes. [p. 697.]

Forthcoming Engagements

Sept. 30.—INSTITUTION OF GAS ENGINEERS.—Meeting of General Research Committee, 2.30 p.m., 28, Grosvenor Gardens, S.W. 1.

Oct. 1.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Meeting at Dunfermline. Presidential Address of Mr. D. Warden.

Oct. 4.—INSTITUTION OF GAS ENGINEERS.—Meeting of Sir Arthur Duckham Memorial Fund Committee, 3 p.m., 28, Grosvenor Gardens, S.W. 1.

Oct. 5.—B.C.G.A.—Scottish District Conference at Dumbarton.

Oct. 6.—MIDLAND JUNIOR GAS ASSOCIATION.—Meeting in Birmingham. Presidential Address of Mr. F. A. C. Pykett.

Oct. 7.—NORTH OF ENGLAND ASSOCIATION.—Autumn Meeting.

Oct. 7.—INSTITUTION OF CHEMICAL ENGINEERS.—Meeting at Burlington House, Piccadilly. Paper on "Fluid Friction and its relation to Heat Transfer," by Dr. C. M. White.

Oct. 8.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Meeting in Glasgow. Presidential Address of Mr. S. M'Gown.

Oct. 10.—INSTITUTION OF GAS ENGINEERS.—Meetings of Finance Sub-Committee, 2 p.m.; Finance Committee, 2.30 p.m.; Executive Committee, 3 p.m.; Benevolent Fund Committee of Management, 4.30 p.m., 28, Grosvenor Gardens, S.W. 1.

Oct. 11.—INSTITUTION OF GAS ENGINEERS.—Meetings of Council, 10 a.m.; Board of Examiners, 12.15 p.m.; Gas Education Committee, 4 p.m., 28, Grosvenor Gardens, S.W. 1.

Oct. 12.—INSTITUTE OF FUEL.—Meeting at Burlington House, Piccadilly. Paper on "The Treatment of Tar," by Dr. J. G. King and Dr. M. A. Matthews.

Oct. 13.—INSTITUTION OF GAS ENGINEERS.—Meetings of Joint Lighting Committee, 11 a.m.; Gas Appliances Sub-Committee, 2.30 p.m., 28, Grosvenor Gardens, S.W. 1.

Oct. 14.—SOCIETY OF CHEMICAL INDUSTRY.—Meeting of the CHEMICAL ENGINEERING GROUP, Burlington House, Piccadilly, 8 p.m. Paper by Prof. J. S. S. Brame on "Colloidal or Coal-Oil Fuel."

Oct. 14.—MANCHESTER DISTRICT ASSOCIATION OF GAS ENGINEERS.—Visit to works of Messrs. Clayton, Son, & Co., Ltd., Hunslet, Leeds.

Oct. 19.—B.C.G.A.—Meeting of the Executive Committee, 28, Grosvenor Gardens, S.W. 1, 2.30 p.m.

Oct. 20.—SOCIETY OF BRITISH GAS INDUSTRIES.—Meeting of Council at 56, Victoria Street, S.W. 1, in the afternoon.

Oct. 27.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—Meeting at 28, Grosvenor Gardens, London, S.W. 1, 2.30 p.m.

Oct. 27.—MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Autumn general meeting.

Oct. 31.—LONDON AND COUNTIES COKE ASSOCIATION.—Meetings of Executive Committee, 11 a.m.; Central Committee, 12 noon; Luncheon, 1 p.m.; Annual General Meeting, 2.30 p.m.; Hotel Metropole, Whitehall Rooms, S.W. 1.

Nov. 1-2.—INSTITUTION OF GAS ENGINEERS.—Autumn research meeting.

Nov. 3.—SOCIETY OF BRITISH GAS INDUSTRIES.—Autumn General Meeting, Hotel Metropole, London.

1932 "JOURNAL" Directory.

Page 48. NEWBURY. L. J. Weaver, Engineer and Manager, deceased.

Page 84. GREENOCK. R. D. Keillor appointed Engineer and Manager vice G. Keillor, deceased.

EDITORIAL NOTES

With the B.C.G.A.

BY the time this issue of the "JOURNAL" is published, the coming-of-age conference of the British Commercial Gas Association, under the Presidency of Councillor Kitson, of Leeds, will have passed into history. It will have taken its place—worthily, we know—in the line of successful gatherings of the same organization which have been held in previous years. Next week we shall devote our pages mainly to giving an account of the conference, which will provide matter of vital importance at the present juncture—matter which should be studied side by side with the paper by Mr. H. D. Madden, and the discussion thereon, at the meeting a few days ago of the Wales and Monmouthshire Association, as reported on later pages of this issue.

Therefore we would say: "Give special attention to the number of the 'JOURNAL' dated Oct. 5."

Report of the General Committee

THE accounts of the General Committee of the B.C.G.A. cover the twelve months ended at March last, and it is gratifying to note that, in spite of the national economic crisis, the Association's total income showed an increase of several thousand pounds over the previous year. But the present total must not be regarded as anything in the way of a "high water mark." The fight grows sterner, and ever sterner, and nothing short of the very utmost possible support from the Gas Industry at large can suffice to wage it successfully. Here are sentences culled from the report, which deals with the past twelve months: "Intensified competition and the lessened spending power of the public make new business increasingly difficult to secure, and render wise, well-planned adequate publicity all the more necessary. The Committee therefore hope that, during the current year, the Association's funds will be augmented by many additional subscriptions on the supplementary 1s. 6d. per million basis. Subscriptions to this special voluntary fund reached a total of approximately £16,000 during the year under review, and the whole was devoted to increased publicity, but the volume of that publicity was even then far below the level at which highly profitable results could be obtained per £ expended. In publicity, every additional £1000 expended is more fruitful than the last, up to a point far beyond any yet reached by the Gas Industry." Based on the output of gas, the subscribing undertakings now represent 96 p.ct. of the Industry; and what is most urgently needed is that the whole of these 878 subscribing undertakings—not, as at present, only a good majority—should subscribe at the full ordinary-*plus*-special rate of 7s. 6d. per million to the national organizations of the Industry.

At this time of day, the Gas Industry cannot hope to progress without effective publicity, and this publicity must be of two kinds—national and local. Only a few undertakings can of themselves undertake national publicity; but prominent examples of the Gas Light and Coke Company's broad-minded (and withal, we are convinced, shrewd) policy in this respect are quoted with appreciation by the Committee in their report—namely, the arranging of a highly successful gas exhibit at Charing Cross Station, and the conducting of a striking newspaper publicity campaign in connection with the renewal for fifteen years of their contract for the lighting of a large and important section of the City of Westminster. The report also places on record appreciation of the work of the Joint Committee who organized the effective Gas Exhibit and Gas Section at the British Industries Fair at Birmingham, and of the Joint London Gas Exhibit Committee in connection with their annual exhibit at the Ideal Home Exhibition, Olympia. But above all this is the sustained effort of the B.C.G.A. to ensure that gas occupies its rightful place in the public mind. This effort must be proportional to the strength that lies behind it—"strength" in this case being represented by financial support. It will be useless for members of the Industry to complain of the keenness of competition if at the same time they are not "pulling their weight" as subscribers to the national organizations. There can be no valid reason why one should reap where another has sown—a point which was emphasized at the meeting of the Wales Association, in connection with the central industrial laboratory provided by the Cardiff Gas Company, and contributed to by some (but not all) of the undertakings in the area.

Glancing at some of the items in the report (which is signed by Councillor Kitson, the President, and Sir Francis Goodenough, the Chairman), it is satisfactory to note that the Association's education scheme for gas salesmen, which was launched in June, 1931, is receiving the steadily increasing support and practical appreciation of members in all parts of the country. During the past year, too, the Association have made an important development in their service to members by the provision of several qualified lecturers, whose services are available at moderate fees. Work of far-reaching importance has been done in lecturing to the senior science students at more than 70 schools (embracing nearly 6000 students) in various parts of the country. Useful work has also been done in the giving of "talks" by women lecturers to women at exhibitions and demonstrations and on other suitable occasions, and the services of two qualified lecturers are available for this particular purpose.

On the personal side, with sincere regrets at the enforced retirement through ill-health of Mr. W. M. Mason, and the retirement into less active work for the Association of Mrs. Cloudesley-Brereton, are mingled congratulations to Mr. J. C. Walker, on his appointment as chief executive officer, with the title of General Secretary. All who are in close contact with the Association must have been aware of the good work that has been done by Mr. Walker in the past, and, with us, must feel confident that in appointing him to his new position a wise selection has been made. Further cause for congratulation is to be found in the last lines of the report. This time it is the Industry that is to be congratulated—upon the fact that Mr. William Cash, the Chairman of the Bournemouth and Croydon Gas Companies, has consented to be nominated for election as President for the year 1932-33.

Exploration and Application

IN the area of supply of every gas undertaking there exist possibilities for the sale of gas which does not fall into the domestic category. Even in residential districts heat is required in several processes which are only indirectly connected with the home. The local boot repairer, for example, requires heat for his trade, and the local garage proprietor also requires heat. And wherever heat is needed there lies the possibility of the application of gas. Such instances could be multiplied; and it is a business duty of all gas suppliers to explore their districts thoroughly with a view not necessarily to immediately gaining enormous loads, but to adding to the existing load a series of minor industrial supplies. Any one of these supplies may in itself be small, but in the aggregate the extra sales are more than worth the effort needed to gain them. A boot maker in a small way may extend his premises, for example; and in any case every minor application of gas has a valuable effect in inculcating in the public mind the scope and variety of service which the Gas Industry can offer, and an appreciation of the fact that the Industry is alert to seize all opportunities.

This idea is not new, but no excuse need be offered for emphasizing, as Mr. H. D. Madden, of Cardiff, did

in a paper before the Wales and Monmouthshire Association of Gas Engineers and Managers last week, that a vast field of opportunity lies at the door of all gas undertakings. There is plenty of competition in the industrial market from coal, oil, and electricity, and it cannot be said that competitive interests are idle in their pursuit of new business, whether this business is on a small or a large scale. There are many suggestive points in Mr. Madden's paper. In regard to competition, for instance, he refers to the gas unit of 4000 B.Th.U. as a useful competitive weapon in the hands of the modern gas salesman. He thinks that the public, including the industrialist, is more able to appreciate the relative costs of electricity and gas when both are stated on the same basis—cost per unit. This may be useful in regard to small-scale applications, but we doubt its utility when we turn to large-scale use. If we are going to compare the gas unit with, shall we say, a coal unit, or an oil unit, gas will not in general shine on a first fuel cost basis. As a matter of fact, it has been suggested on more than one occasion during the past two years in the United States that in such competition the therm itself is too small a unit—and the therm is twenty-five times as large as the quoted gas unit! In the industrial business so much depends on the final cost of the finished product, and this final cost cannot be arrived at without taking into account many factors apart from first fuel costs. There are, for instance, considerations of capital expenditure, efficiencies in use, labour, space, and convenience. And on the matter of convenience, the application of gas in a modern "continuous line factory" has ensured that smooth running upon which any continuous system depends. In such an application gas becomes a link in a chain; and the reliability of gas means that this link is no less strong than any other, and that no blame in regard to production can be attached to the fuel used.

In saying this we are not in any way belittling the obvious and wholly important selling-point of supplying gas at a competitive fuel rate. Legal restrictions are at present interfering largely with the Gas Industry's desire to offer industrialists cheap gaseous fuel, but even at the present time quite a lot can be done, and it is to be hoped that in the near future the Gas Industry's legal hardships in this direction, as in others, will be alleviated. In any approach to the industrial load the fact must always be borne in mind that installation costs for the service to an industrial premises are, in relation to the load resulting from any large-scale application, extremely small compared with the expenditure needed to lay service pipes to domestic dwellings, which in modern times are scattered. Then again, in by far the majority of cases the addition of the industrial load does not involve capital outlay on additional gas-making plant, though, of course, such outlay may eventually become necessary. Thus the attitude of the gas undertaking seeking industrial business—as is mentioned by Mr. Madden—ought to be based on the cost of gas into holder. Moreover, the additional load has the inevitable effect of reducing the capital employed per therm supplied.

A Step Forward

Of the many recent developments to promote industrial gas sales, none can be more important than the institution of central organizations to serve definite districts in the country. Such organizations included an industrial laboratory, adequately equipped and with a competent technical staff. The smaller undertakings could not afford to inaugurate on their own account laboratories of the nature required to explore the industrial use of gas and to apply research to the modification of existing equipment or the development of entirely new gas using apparatus. Now, however, by subscribing to the central organization of their district they can obtain results which will be of immediate service to them, and they will doubtless find that their expenditure in this direction will be amply repaid not only to their individual benefit but to the benefit of the Industry as a whole. It would, we feel, be difficult for any gas undertaking to advance a convincing argument for not subscribing at least a small sum towards the equipment and upkeep of the central laboratory. Such a laboratory has, of course, been in operation in Birmingham for many years, and no one will deny that it has been of enormous value to the Gas Industry as well as to the Birmingham Gas Undertaking itself. We could mention many other undertakings which have had the foresight to organize industrial laboratories, workshops, and demonstration rooms, and whose enterprise has rewarded both themselves and the entire Gas Industry.

The future development of the industrial business of the Gas Industry depends largely on the pooling of knowledge and on enthusiastic support—practical as well as theoretical. If that support is forthcoming it does not take much imagination to envisage a closer linking of the work in the districts and a very much wider dissemination of the knowledge which is essential to the gas salesman when he goes out to face modern intensive competition backed up by efficient sales and technical organization. The point we would stress is that each undertaking should bear its share of the cost of obtaining information on what we consider to be most economical lines. There must be hundreds of instances where a small gas undertaking, probably miles away from an industrial centre, is faced with a problem of a minor industrial application of gas which has already been solved by a larger undertaking; and time and money will be saved—and business which otherwise may be lost will be gained—by the small undertaking if it has at its disposal the guiding results of experience already gained by the larger undertaking. There is, of course, another aspect of the central laboratories. They act as demonstration showrooms; and the practical advantages of actually demonstrating to the industrialist the application of gas cannot be over-stressed. In no single instance has the institution of such demonstration premises proved a failure.

An Advantageous Opportunity

We think we have done a useful service to the Gas Industry by our sustained advocacy during recent years of the recovery of benzole at gas-works. There is no need on this occasion to reiterate the many arguments in favour of the process; suffice it to say that the outstanding advantage—net financial gain—has been proved. More and more benzole is being washed from gas as time goes on; and the recent advance in price of imported petrol has added greater incentive to adopt benzole recovery. Even with former petrol prices benzole recovery was definitely a paying proposition for the majority of gas undertakings. To-day every gallon of benzole recovered has the benefit of an extra threepence. An advantageous opportunity; and there can be no excuse if it is not seized.

Non-Competitive

There still exists in some quarters the idea that gas and coke are in competition—a view with which we do not agree, and which, as far as available information is concerned, is not supported by facts. There are at hand to-day a variety of gas-using appliances, and also coke consuming apparatus, designed to fulfil particular conditions in the best manner. The insulated storage water heater, for example, has opened up quite a new field for gas—which does not mean to say that the instantaneous water heater is no longer required, both appliances being capable of different duties. In all instances gas is, on every score except that of first fuel cost, a better form of energy than coke; but with current prices it has to be admitted that the coke fired hot water apparatus, whether this be used for domestic water supply or for central heating, is an economical proposition and is rapidly gaining favour. To our mind there is no reason why the Gas Industry should be at all perturbed about this. Only a few weeks ago a paper was published in the "Gas Salesman" in which figures were set out showing that the installation of a coke boiler and increased gas consumption go hand in hand. The Gas Industry obviously is desirous of selling cheap gas. It also manufactures a solid smokeless fuel which in the past has been too loosely regarded as a residual instead of a very important product of carbonization. The price at which gas can be sold depends primarily on

the revenue from coke. The more secure the market for coke, and the better price at which it can be sold, the cheaper the price at which gas can be supplied, and hence the greater the gas consumption.

We have long maintained that the Gas Industry, provided it supplies an efficiently graded coke of uniform and suitable composition, has an enormous outlet for the coke it makes. On several occasions we hear of the competition which the Gas Industry is having, or may have, to face from oven coke. But the potential market is so vast that there is ample scope for both Gas and Coke Oven Industries provided the problem is properly tackled. It is not a bit of use for the Gas Industry to supply dense coke one minute, dry coke the next, porous coke the next, and wet coke the next to the same consumer; and it is apparent that the Coke Oven Industry is awake to the reality of the situation and is concentrating quite a lot of attention on the production of domestic, as distinct from blast furnace, coke. On later pages to-day is an extract from a useful paper presented by Mr. R. A. Mott at a meeting of the National Smoke Abatement Society last Saturday. The author's name and his work are by no means unknown to our readers; and there is much of value in his contribution. He speaks from the point of view solely of the Coke Oven Industry, and his concluding remarks express his attitude: "A vision of the production of domestic fuels in coke ovens to meet all requirements at present met by coal may be the reality of the future. It is quite certain that increased use will be made of oven coke for domestic purposes without any incentive of Government action, on account of the greater efficiency in use, its smokeless combustion, and its cheapness." This we regard as only half the story. Whatever the Coke Oven Industry may do—and it is capable of doing much—in this direction, the Gas Industry is also able to accomplish. Already it has sales organizations well able to translate the ideal of coke service into practical effect; already it is fully able to produce different types of coke suitable for the open fire, domestic water supply, and central heating. No vision of the future consumption of high-temperature cokes can be at all complete without the inclusion of the two high-temperature coke producers—the Gas Industry and the Coke Industry.

Turning now for a moment to the practical points dealt with by Mr. Mott, we are in complete agreement with him when he suggests that high-temperature cokes are thoroughly well fitted to fulfil the demands of the householder for a cheerful open fire, provided they are burned in suitable types of grate—of which there are at the present time several efficient and inexpensive varieties. Coke gives a higher radiant efficiency than coal, is definitely more economical in use, develops the cheerful fire by which the Englishman lays great store, and meets the demand of present-day civilization, for a good citizen should have no desire to pollute quite unnecessarily the atmosphere which he shares with his fellow-beings. Great stress is laid by the author on the need for employing, whether it be in the open firegrate or in the closed boiler, cokes of proper grade. Size has a marked effect not only on the thermal efficiency of a closed boiler or a fire, but also on the practical efficiency—the workability of the fuel from the viewpoint of the householder. Shape, moisture and ash contents—in regard to the latter the type as well as the amount of ash—and, above all, uniformity in any grade, are essential to the full success of coke sales; and the Gas Industry is quite capable of meeting these conditions. We will not enter into any detail concerning the paper except to endorse the author's remarks about the advantages of employing on anything like a reasonable size of installation two separate boilers, one for the production of the domestic hot water supply, and the other for central heating purposes. He points out that it is possible to use only one boiler, but this has to be maintained in use all the year round to produce domestic hot water, while, with separate boilers, the central-heating installation can be out of action for at least five months of the year. With severe demands on domestic hot water the central-heating system is starved, and excessive hot-water supplies may be produced when a higher temperature in the central-heating system is required. The cost of the installation of the two systems is about the same, so that the advantage remains with the separate installations.

CORRESPONDENCE

Cornish Iron Oxides

SIR,—In your issue of May 4, 1932, you kindly inserted information regarding the development of the new industry of which I am the promoter as Director of British Iron Oxides.

Developments since that time may be of interest to your readers. Reports from our experimental parcels from gasworks have been so satisfactory that we are now in a position to hold our own against the competition of any foreign ores or any synthetic compound.

British Iron Oxides, Ltd., has now acquired all the deposits in Cornwall of oxide that can be used for gas purification. They can be split into two different groups—those which contain fibre, and those which are non-fibrous. The fibrous material is of distinct interest and has been the filter for the collection of oxide from the mine drainage channels. This has resulted in the fibre being highly charged in its tubes with an oxide distinctly active. The outside surrounding surface of the fibre also acts in collection, so that after removal a product is obtained of a material highly charged with oxide. The non-fibrous oxide is distinctly a precipitate, and is deposited immediately it is leached from the mineral lodes. The fact that this oxide is infinitely more active than the foreign ores is not surprising when the geology of the county is taken into consideration. Cornwall is renowned for its complex ores, and all lodes existent are charged with iron sulphides. The fact that since the county were trading with the Phœnicians operations underground have been in progress has resulted in workings hundreds of fathoms below surface, the extent of which can only be appreciated by those who have visited underground. All drainage finds its way to the sea and is assisted by drainage tunnels which cover many miles. It is therefore obvious that a colossal tonnage of oxide has been precipitated. Actually it is still charging underground tunnels and valleys.

The oxide cannot be truly described as a competitor to natural bog ores, as its degree of activity is much higher, and is usually employed in the purifiers in the proportion of 30 p.ct. Cornish oxide with 70 p.ct. of foreign. A factor of interest is the brisk revivification subsequent to fouling; and works are finding that purification costs are reduced by its use.

In the last few months a considerable tonnage has found its way to the purifiers, and in cases where actual observation has been made the reports are satisfactory and are leading to further orders.

Tests made by two foreign works of importance have led them to negotiate for the supply of a very large tonnage spread over twelve months, in which case the export would be from the Port of Falmouth.

In view of developments, the Company has now found it necessary to transfer its Head Office from London to Cornwall, and is now at Mansion House, Truro, Cornwall.

The spent oxide from Cornish oxide finds a ready sale, and on the same market basis as spent from foreign ores.

Yours, &c.,

PERCY BONDS,

Director, British Iron Oxides, Ltd.

"Trecoose," Blackwater,
Nr. Truro,
Sept. 21, 1932.

PERSONAL

THE WOODALL-DUCKHAM COMPANIES.

At a Meeting of the Board of the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., held on Friday, Sept. 23, Mr. F. B. RICHARDS was appointed Chairman of the Company.

The Board also appointed a Committee of Management consisting of the Chairman (Mr. F. B. Richards), the Managing Director (Mr. G. J. Jackson), who will continue to be responsible for the Company's Constructional Work,

[Photo. by Mesdames Morter, 4, Lower Grosvenor Place, S.W. 1.

MR. F. B. RICHARDS.

and the Technical Director (Dr. E. W. Smith), who will have charge of the Design, Development, and Operation sides of the Company's business.

Mr. Richards and Mr. Jackson have for some years been the Managing Directors of the Company, and have been associated from the earliest days with the late Sir Arthur Duckham in the development of the Woodall-Duckham continuous vertical retort, and in the building up of the Woodall-Duckham Companies. Dr. Smith has held the position of Technical Director to the Woodall-Duckham Companies since 1920.

Mr. F. B. Richards was also elected Chairman of Woodall-Duckham (1920), Ltd., at a meeting of the Board of that Company held on the same day.

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MR. R. W. EDWARDS.

After three years as Mayor of Aldershot, Mr. R. W. Edwards, Chairman and Managing Director of the Mid-Southern Utility Company, will shortly relinquish his civic office. Regarding this, the following note appeared in a recent issue of the "Aldershot News and Farnborough Chronicle": "The formalities in the Borough Council for the election of a new Mayor of Aldershot for the ensuing year may be regarded as bringing to an end, except for the official expression of well deserved thanks that will, of course, follow, the three years' splendid service rendered to the Borough by Councillor R. W. Edwards, J.P., C.C., in his capacity as Mayor. However much the Council and the Burgesses may have desired his continuance in that office, and there does exist widespread desires to that end, it is frankly recognized that it would be unfairly taxing a generous nature to press for such a continuance, for throughout those three years both Councillor Edwards and Mrs. Edwards have as Mayor and Mayoress never spared themselves in carrying out their very arduous duties, and the kindly manner in which they have entered into every portion of the communal life of Aldershot have greatly endeared them to all. Although the demands on his time and attention made by his very important business affairs have tended to increase rather than decrease throughout his three years of office, Councillor Edwards has maintained an undiminished practical interest in the municipal and public affairs of the Borough, while Mrs. Edwards has devoted similar whole-hearted interest to all good works. They have never spared themselves in doing all in their power to help every commendable object within the Borough."

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The Greenock Corporation have appointed Mr. RONALD D. KEILLOR, Assistant Engineer and Manager to the Gas Department, to the post held by his father, the late Mr. George Keillor. "Mr. Ronald Keillor," states the "Greenock Telegraph," "possesses capabilities which give promise of his being a worthy successor to his father, who held a leading position in the Industry."

* * *

Mr. J. N. WHITESMITH has recently joined Messrs. Parkinson & Cowan, Ltd., as Production Engineer to their several factories. Mr. Whitesmith has been connected with Messrs. Metropolitan-Vickers Electrical Company, Ltd., for a considerable number of years in a similar capacity, organizing manufacturing processes and quantity production.

OBITUARY

MR. ALFRED AUSTIN.

The announcement of the death of Mr. Alfred Austin will be received with deep regret by all who knew him. His unfailing courtesy and charm of manner were characteristic during the 37 years for which he represented the Cannon Iron Foundries, Ltd., Deepfields, so faithfully and well. His loss is keenly felt by the Directors and colleagues. The whole-hearted way in which he worked in

THE LATE MR. AUSTIN.

the interests of gas stamped him as a friend whom the Gas Industry will miss.

Heartfelt sympathy is extended to his relatives in their bereavement.

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MR. THOMAS PRICE.

It is with much regret we have to announce the death of Mr. Thomas Price, which occurred suddenly on Sept. 23.

Mr. Price had been Engineer and Manager of the Walton-on-Thames and Weybridge Gas Company for 40 years. He was trained under Mr. Edward Price, late of the Hampton Court Gas Company, and later was Assistant at Hampton Court, whence he transferred to Walton.

He leaves a widow, daughter, and two sons, the elder of whom, Mr. Conrad Price, is Manager at Hampton Court.

The funeral took place on Tuesday, Sept. 27, at Walton-on-Thames.

THE NEWS OF THE WEEK

Having Spent Over an Hour on a discussion of whether to adopt electric lighting for the streets, Ilminster Urban District Council, at its meeting on Sept. 24, resolved to continue to use gas.

The Newbury Corporation reports that arrangements have been made for the transfer at the end of the month of the Thatcham Gas Undertaking, and the laying of additional mains will then be commenced.

Trials with a Motor Lorry driven by town gas compressed in cylinders are at present being carried out in Brussels by the Compagnie Générale de Gaz et de l'Electricité, who have installed a special gas-compressing plant at their works at Jette.

Manchester District Association of Gas Engineers.—The next Ordinary General Meeting of the Association will be held on Friday, Oct. 14. A visit will be made to the Gasholder and Boiler Works of Messrs. Clayton, Son, & Co., Ltd., Moor End, Hunslet, Leeds. Mr. Leonard Hartley, a Director of the firm, will submit a paper on "Gasholders."

Candles in Hospital.—On the night of Sept. 20, many streets and buildings in the Hammersmith district were in darkness when the electric current failed, while the West London Hospital was also affected. Fortunately no operations were in progress at the time. The hospital carries a supply of candles in case of an emergency of this kind, and these were used to light the wards.

Hot Water for the Competitions at the Hairdressing Fashion Fair, which opened in the Empire Hall, Olympia, on Sept. 20 (and continues until Sept. 29), is supplied by a thermal-storage gas installation by Messrs. Thomas Potterton (Heating Engineers), Ltd., of Cavendish Works, Ravenswood Road, Balham, S.W. 12, and a working example is on view on the first floor, while an installation is also exhibited on the stand of Messrs. H. E. Jarvis & Co., Ltd., of 6, Percy Street, W. 1, who are specialists in complete installation of modern hairdressing saloons.

Drakes Limited.—The Annual Accounts of the Company for the twelve months ended Dec. 31, 1931, which have just been issued, show a profit of £14,673, which, in view of the continued depression in industry, is a very satisfactory result.

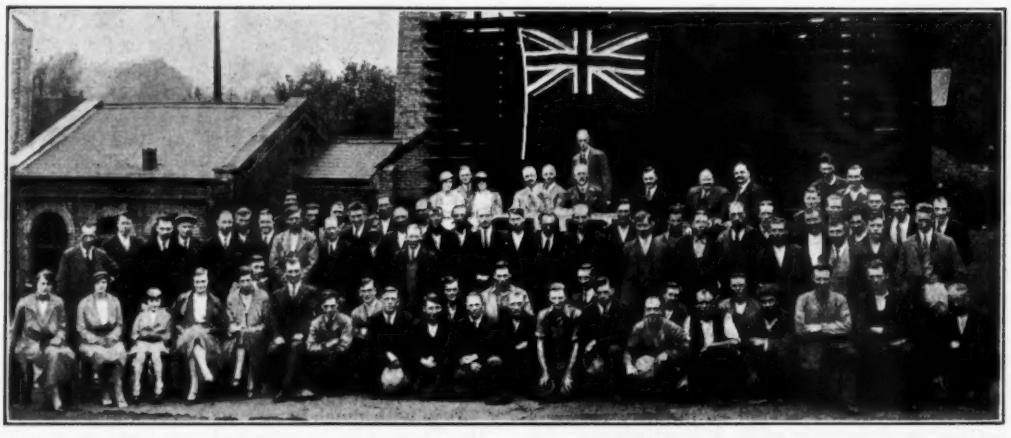
The Formation of a Joint Gas Authority for the towns of Mossley, Stalybridge, Dukinfield, and Hyde, mentioned in the "JOURNAL" for Sept. 14, p. 561, is, we learn, not to be considered further. The whole idea has been abandoned.

Joint Showrooms at Coventry.—Intimation has been received by the Coventry Corporation that the loan sanctions for the proposed gas and electricity showrooms will be issued in due course, and that in the meantime tenders may be invited for the work. The subject has been discussed by the Gas and Electricity Committees, which have decided to ask the City Council for authority to issue instructions for the preparation of the quantities.

The New Spiral-Guided Gasholder at Crowlands, Southport, is nearing completion. The holder is now being tested full of air, and can be seen at its full height. It will be capable of storing 3,100,000 c.ft. of gas. The weight of the steel tank is 660 tons, and the holder 752 tons, and the weight of water contained in the tank is 24,050 tons. Residents in the neighbourhood have complained of its appearance, but it is not yet in its final colour. When it has been finished it will harmonize with its surroundings and be less noticeable.

By Reducing the Period between which meters are read from 11½ weeks to nine weeks, it is estimated at Coventry that additional interest on money collected to the amount of £380 per annum will be obtained. During the past ten years the number of prepayment gas meters has increased by 16,482—namely, from 24,134 to 40,616—but the number of collectors has increased only from 16 to 18. The Gas Committee therefore propose to appoint four additional prepayment meter collectors at the standard commencing salary of £156.

A Presentation at the Ascot Gas-Works



Our photograph was taken on Sept. 15 at the Works of the Ascot District Gas and Electricity Company, when a presentation was made to Mr. A. E. Brooks, upon his retirement from active management of the Company after 33 years' service. Mr. Brooks retains his seat on the Board of Directors. The presentation, which took the form of a set of gold and platinum dress links, buttons, and studs, subscribed for by the staff and workmen, was made by Mr. W. A. Scott, the Chairman of the Company. A presentation was also made by Mr. Scott, on behalf of the Directors and Secretary, of a handsome sporting gun and case. Mrs. Brooks and Miss Peggy Brooks were present, and a floral token to commemorate the occasion was presented to Mrs. Brooks.

International Conference of Benzole Producers.

Sir David Milne-Watson Elected President.

The Fifth Plenary Meeting of the International Conference of Benzole Producers was held in Brussels on Sept. 19, following a meeting of the Technical Committee. Delegates came from Belgium, Czechoslovakia, France, Germany, Great Britain, Netherlands, Poland, Saare, and Spain. The Fascist Confederation of the Italian Chemical Industry apologized for its inability to attend this year.

A meeting on technical and economical matters was held on Sept. 20 in the offices of the Comite Central de Belgique, rue Ducale.

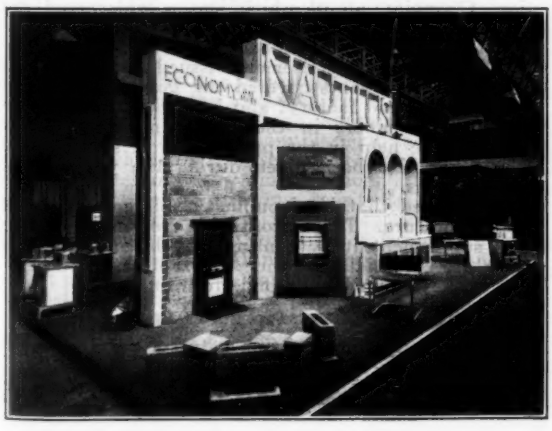
The Chair was occupied by M. Petit, President of the Belgian Association of Benzole Producers. Sir David Milne-Watson, President of the National Benzole Association, was elected President of the International Conference of Benzole Producers, to succeed M. H. Laurain, President of the French Association of Benzole Producers and President-Founder of the International Conference.

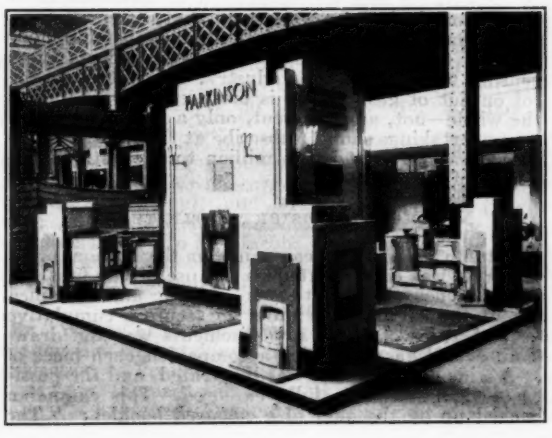
A dinner by invitation of the Belgian Association of Benzole Producers brought the members together at the Hotel Metropole, where toasts were proposed to the health of King Albert, and Sovereigns or Chiefs of States of the Nations represented. M. Laurain, Sir David Milne-Watson, and Dr. Potts, President of the German Benzol-Verband, proposed the following toasts respectively: "The Conference;" "The President;" and "The Hosts."

GAS AT THE BUILDING EXHIBITION

[Photo. by John H. Avery & Co.

Our photographs, taken at the Building Exhibition at Olympia, show (above) a general view of the comprehensive display of the South Metropolitan Gas Company, where a wide range of "Metro" Appliances are on view. The photographs below are of the striking stand of the Parkinson Stove Company, Ltd., of Stechford, Birmingham, and of the excellent display of the Nautilus Fire Company, Ltd., of Luton. Details of the individual exhibits of these and other firms in the Industry appeared in last week's "JOURNAL."





THE NEWS—continued.

Institution of Gas Engineers.

The Gasholder Sub-Committee of the Institution of Gas Engineers has made arrangements for the undermentioned publications to be available for inspection by members in the Library of the Institution:

(1) Translation of the German Standard Specification for the Construction and Erection of Low-Pressure Gasholders.
(2) Report on "Procedure Recommended by the American Gas Association for Purging and Placing Gasholders in Service or Removing them from Service."

Optical Society Dissolved.

At a special general meeting of the Optical Society held at the Imperial College of Science and Technology, South Kensington, on Sept. 22, the Society was formally dissolved.

This was the final step in the process of amalgamation of the Society with the Physical Society of London, which has already made the necessary changes in its constitution. The joint Societies will be known as the Physical Society, and the first meeting of the new session will be held on Friday, Oct. 7, at 5 p.m. at the Imperial College of Science and Technology, South Kensington, when Dr. J. W. French, F.Inst.P., will lecture on "The Manufacture of Optical Glass."

Gas Propaganda Among Architects and Doctors.

Being of opinion that there is much to be done in the way of gas propaganda in favour of the use of gas among architects, the French Société pour le Developpement de l'Industrie du Gaz is organizing a competition, confined to members of the architectural profession, for the best lay-out of the interiors of houses and flats for the installation of gas-using appliances.

Similarly, with the object of combating any idea that the use of gas stoves and radiators is not healthy, the Association arranged for the reading of a paper by a doctor on the advantages of gas radiators at a recent medical congress in Lyons.

British Commercial Gas Association

TWENTY-FIRST ANNUAL REPORT OF THE GENERAL COMMITTEE.

The report covers the work done during the past twelve months; the accounts cover the year ended March 31 last.

The future holds many problems for the Gas Industry, among which improved methods of commercial administration and of salesmanship in the fullest sense of that word, individual, local, and national, will play an important part. It is to the effective solution of these problems that the efforts of the Association as an organization as well as of its members as individual units in the Industry, must be directed with increasing energy, determination, skill, and enthusiasm. The busiest and most testing years of work lie immediately before one and all.

It is encouraging to report that, notwithstanding the national economic crisis during the financial year under review—namely, the twelve months ended March 31, 1932, the Association's total income showed an increase of £4270 over the previous year.

While it is gratifying to report an increase in income in a period of trade depression unprecedented in the recollection of any of us, the General Committee urge most strongly the necessity of securing for the Association the highest possible income. Intensified competition and the lessened spending power of the public make new business increasingly difficult to secure, and render wise, well-planned, and adequate publicity all the more necessary.

The Committee therefore hope that, during the current year, the Association's funds will be augmented by many additional subscriptions on the supplementary 1s. 6d. per million basis. Subscriptions to this special voluntary fund reached a total of approximately £16,000 during the year under review, and the whole was devoted to increased publicity, but the volume of that publicity was even then far below the level at which highly profitable results could be obtained per £ expended. In publicity, every additional £1000 expended is more fruitful than the last, up to a point far beyond any yet reached by the Gas Industry.

The Committee are pleased to report that eight undertakings applied for and were admitted to membership of the Association during the year, and that, after allowing for amalgamations, the Association's membership now stands at a total of 878 subscribing gas undertakings, representing 96 p.ct. of the Industry, calculated on the basis of output of gas. What is most urgently needed is that the whole—not, as at present, only a good majority—of those undertakings should subscribe at the full ordinary-*plus*-special rate of 7s. 6d. per million to the national organizations of the Industry.

National and District Publicity.

The autumn and winter campaign in the National and District Press was concentrated on the use of gas fires. A distinctive type of layout was chosen and retained throughout the campaign in order to secure a cumulative effect. A feature of these advertisements was the drawing of an actual gas fire which accompanied each piece of copy. A wide range of fires was illustrated, and the possibilities of variation were fully explored. This campaign was backed up by the offer of a coloured booklet: "The Sun on the Hearth," designed to show the advantages of gas fires in every room of the house.

The spring campaign dealt with water heating. The keynote of this campaign was variety, in respect both of treatment and of space.

Throughout the year special advertisements were inserted in the more important and influential of the National newspapers concentrating upon the stability and progress of the Industry and the soundness of gas stock. These advertisements attracted much favourable comment both inside and outside the Industry, and several undertakings which made issues of stock circulated reprints of the advertisements to existing shareholders and prospective investors.

The General Committee believe that the Association's publicity on these lines has done and will do much to establish and maintain in the minds of the public the strength of the present position of the Industry and the brightness of its prospects for the future.

The early autumn of 1932 has seen the commencement of a new campaign on gas fires in which photographic treatment and modern typesetting are the main features of the advertisements. For this campaign the Association adopted the slogan: "Thank Goodness for Gas," and this appears prominently in all the advertisements.

In dealing with the subject of National Publicity, the General Committee feel that all members of the Association would wish to place on record in this report appreciation of the work of (1) the Joint Committee which organized the effective Gas Exhibit and Gas Section at the British Industries Fair at Birmingham; (2) the Gas Light and Coke Company (*a*) in arranging a highly successful gas exhibit at Charing Cross Station, and (*b*) in conducting a striking newspaper publicity campaign in connection with the renewal for fifteen years of their contract for the lighting of a large and important section of the City of Westminster; and (3) the Joint London Gas Exhibit Committee, for their annual exhibit at the Ideal Home Exhibition, Olympia; all of which had a widespread national appeal and influence.

A fair number of members have made good use of a new volume of advertisements issued by the Association. These advertisements covered the general applications of gas in home and factory, and have been employed extensively by members in their local publicity campaigns. Considerable help in the preparation of special advertisements has also been given during the year to member undertakings.

It is hoped that local publicity will grow still more in the near future. Those profit most from national publicity who supplement it by continuous related local publicity. Both are essential. Neither can replace the other. Together they can achieve wonderful results.

General Propaganda.

The good relations existing between the Association and the Press have been fully maintained, and the activities of the Association in regard to propaganda (through the Editorial Department and other channels) have been re-

flected in the many favourable references to gas to be found in the National and District newspapers, popular magazines, and Technical Press. Good notices in the Press have been secured at all important conferences and exhibitions where the Gas Industry has been represented during the year.

(*a*) "*A Thousand-and-One Uses for Gas.*"

This publication has been issued monthly throughout the year, and continues to prove an inexpensive and effective medium for bringing home the various uses of gas to professional men, manufacturers, and the general public. Among the subjects dealt with were the use of gas in the canning and pottery industries, water heating, flood and landscape lighting, and the heating of exhibition halls. Central heating also received special attention. The sale of this most valuable advertising medium ought to be ten times as great as it is. The cost of its widespread distribution is a most profitable investment.

(*b*) "*The Flambeau.*"

A new quarterly illustrated magazine designed to appeal particularly to the housewife was produced this year. Its pages have included domestic articles, short stories, verse, recipes, and household hints, as well as articles definitely devoted to the uses of gas in the home. Some 30,000 copies of each of the first two issues were bought by members, and it is hoped that this valuable method of gas propaganda will obtain increasing support in the future. Every effort will be made to increase its effectiveness, issue by issue.

British Industries Fair, Birmingham.

The Gas Industries Section of the Fair—already briefly referred to—grows in popularity and importance each year.

The Gas Industry Information Bureau, organized jointly by the Association and the members of the Heavy Section of the Society of British Gas Industries, was again a distinctive and valued feature of the Section.

New features were introduced into the joint exhibit, providing an added liveliness and paving the way for the useful work done by the staff of expert sales representatives, whose services were kindly lent by member undertakings.

The Gas Industries Section was honoured by a visit from H.R.H. the Prince of Wales, who expressed his appreciative interest.

Leading journalists repeated their visit to the Section as the guests of the Association, and subsequently gave considerable editorial space in their papers to various aspects of gas and its uses.

District Conferences.

District Conferences were held during the year at Swansea, Stockport, and Dartmouth, and were all well attended.

These conferences form a definite and valuable feature of District propaganda for gas; they provide the opportunity for consolidating and fostering goodwill; and they receive valuable support from the Press who in all cases give good reports of the proceedings. There is no doubt that these conferences are of lasting value to the Industry in the area in which they are held.

Scheme of Education and Training for Gas Salesmen.

The Association's education scheme for gas salesmen, which was launched in June, 1931, is receiving the steadily increasing support and practical appreciation of members in all parts of the country.

Under the guidance of the Gas Commercial Education Committee several amendments and improvements have been made in the scheme. Notable among these is the addition of a handbook on the subject of "Gas Sales Technology" to the "Domestic Gas Salesmanship" Course, which will add considerably to the value of the course, particularly to the junior sales personnel of the Industry.

Members who have had the opportunity of studying the effect of the course upon the work of their sales staff have not hesitated to testify their high appreciation of its practical value, and that testimony is confirmed by the enthusiasm with which the course has been taken by individual sales representatives, among whom added keenness, increased skill, and growing *esprit de corps* are evident in gratifying measure.

Recognizing the urgent need for better salesmanship in the Industry, alike in policy and in individual performance, in order that prosperity may be ensured and progress maintained against ever-growing competition, the General Committee earnestly commend the scheme to the early and serious consideration of all members. Expenditure on the training of salesmen by a scheme that has been proved to be highly practical and remarkably effective is an investment of the most certainly profitable character.

Official Lectures.

During the past year the Association has made an important development in its service to members by the provision of several qualified lecturers, whose services are available at moderate fees.

Work of far-reaching importance has been done in lecturing to the senior science students at more than 70 schools (embracing nearly 6000 students) in various parts of the country.

The Association aims at getting the young mind interested in and appreciative of the magnitude of the Gas Industry and the service it performs to the nation and to the individual in both domestic and industrial life. The work has received the approval and appreciation of numerous heads of schools and teachers, many of whom have not only expressed their appreciation in writing, but have asked for return visits and commended the service to other schools. This is "business building for the future" which it is believed will commend itself highly to all members.

Useful work has also been done in the giving of "talks" by women lecturers to women at exhibitions and demonstrations and on other suitable occasions, and the services of two qualified lecturers are available for this particular purpose.

With the co-operation of members the Committee hopes to see a wide extension of this valuable work.

Staff Changes.

Members throughout the country will have learned with much regret of the enforced retirement through ill-health of Mr. W. M. Mason, for many years a devoted officer of the Association and a friend of many of its members. Together with their cordial thanks for his services on behalf of the Industry go the good wishes of all for the improvement of his health and for happiness in his days of rest.

Another devoted servant of the Industry has retired into less active work for the Association in the person of Mrs. Cloudesley Brereton, whose services to public health and to education as well as to the Gas Industry have been of a character and value that of necessity could be known only to and appreciated by a few. For them the most cordial thanks of the General Committee have been tendered and are here recorded with the best of wishes for her future health and the hope that the President and Chairman may for many years have the value of her experience and advice.

The staff of the Association has now been centralized at Grosvenor Gardens where they will have general guidance and inspiration from the Executive Chairman. Mr. J. C. Walker has been appointed chief executive officer with the title of General Secretary, and will have the best wishes and active support of all members.

Honour to Members.

The Committee place on record their cordial congratulations to Alderman John Henry Lloyd (Past-President of the Association and Chairman of the City of Birmingham Gas Committee) upon whom the honour of the Freedom of his City has been conferred in recognition of his long record of service to Birmingham; and to Alderman George Walker, a Vice-President of the Association, on his election to the high office of Lord Mayor of Bradford.

Vice-Presidents.

The following have been added to the list of Vice-Presidents of the Association during the year: Mr. Geo. H. Boucher (Chairman of the Bristol Gas Company); Councillor T. W. Richardson (Chairman of the County Borough of Salford Gas Department); Dr. Geo. C. Clayton, M.P., J.P., C.B.E. (the newly-elected Chairman of the Liverpool Gas Company); and Col. R. L. Norrington, C.M.G. (Chairman and Managing Director of the Plymouth and Stonehouse Gas Light and Coke Company, Ltd.).

Obituary.

During the past year the Association has lost several of its most distinguished members in the persons of Sir Joseph Calvert; Sir George E. Davies; Sir Henry Wade Deacon; Sir Arthur Duckham; Sir Hallewell Rogers; and Mr. William Woolley.

The Association also mourn the loss of such good friends as Mr. Wm. Griffin (Folkestone); Mr. J. R. H. Jacobs (Southampton); Mr. George Keillor (Greenock); Mr. Fred Lee (Hinckley); and Mr. C. W. Welford (Cheltenham); all of whom took an active interest in the work of the Association. To Mr. Jacobs, in particular, the Association was under a debt for many years of active service on the Executive Committee.

The Next President.

Mr. Wm. Cash, Chairman of the Bournemouth and Croydon Gas Undertakings, has consented to be nominated for election as President for the year 1932-33.

(Signed) Geoffrey H. Kitson, President.
(Signed) Francis Goodenough, Chairman.

THE "JOURNAL" TECHNICAL RECORD

Which contains Reports of Meetings of Gas and Allied Associations

Wales and Monmouthshire Association of Gas Engineers and Managers

GENERAL MEETING AT PORTHCAWL

Once again, for their Autumn Meeting, the Association met at Porthcawl; the date being Thursday last, Sept. 22. On this occasion, however, they met in the handsome new pavilion which has just been erected on the Esplanade, and which should do much to bring still further prosperity to this popular Welsh watering place. At the opening of the proceedings, the chair was occupied by Mr. E. ABLETT, of Swansea, the retiring President. The attendance was large, and included a number of visitors, among whom were Mr. Ross Taylor (of the National Gas Council), Mr. P. S. Hoyte, and Mr. R. J. Rogers. To each of the gentlemen named a cordial welcome was extended from the Chair.

PORTHCAWL GAS-WORKS MODERNIZATION SCHEME.

Before the commencement of the business, the members were heartily welcomed to the town by Councillor DAVID DAVIES, Chairman of the Porthcawl Urban District Council Gas Committee. Mr. Davies remarked that the Pavilion in which they were holding that meeting had been erected at an approximate cost of £15,000, and that though gas had not been utilized in the general lighting, he was pleased to tell them that, in spite of a very strong opposition, the whole of the building would be heated by means of a "Vesta" gas-fired boiler. They were in every way hopeful of proving this method to be more economical than any of the other systems that were considered.

The Council had recently received sanction from the Ministry of Health to borrow a sum of over £15,000 for the purpose of considerably improving the present gas-works; and it was rather singular that, coinciding with the visit of the Association, a meeting of the Council was to be held for the purpose of signing and sealing the contract for the work to commence forthwith. Perhaps this expenditure was long overdue, but the Council had now realized the true possibilities of gas, and were making determined efforts, not only to maintain, but considerably to increase, their present output. He firmly believed that, provided they gave the consumer a good and constant supply of gas, they would have nothing to fear from the advent of electricity. It was very pleasing to note that, although electricity had been in the town for the last two years, yet this year they had sold more gas than in any year prior to the coming of electricity.

Recently he met a friend of his who had installed an electric cooker, and his wife had congratulated him on his wisdom. Everything went very well for a time, but what a surprise they had when the account was presented for the first month's consumption of electricity! The outcome was that the husband made a bold dash for the local gas offices, with definite instructions to go and re-fix their gas cooker. This friend told him (the speaker) that it took him just one month to decide which was the best and the most economical.

The PRESIDENT having thanked Councillor Davies for his remarks, the minutes of the last meeting were read by Mr. OCTAVIUS THOMAS, the Hon. Secretary, and confirmed.

NEW MEMBERS AND ASSOCIATES.

The following additions were made to the membership of the Association:

Member.—Mr. A. J. Cruise, Cardiff, Technical Assistant.
Associates.—Messrs. R. W. Broadhead, Broadhead Constructions, Ltd.; A. G. Barry, R. & A. Main; H. Butterworth, Parkinson & Cowan; G. T. Clark, West's Gas Improvement Company; D. A. Pratt, Firth, Blakeley, Sons, & Co.; E. W. King, R. Dempster & Sons, Ltd.; F. G. Ambler, Sawer & Purves; and A. Whatmore, W. & B. Cowan.

Mr. H. D. MADDEN (Cardiff) said it afforded him very great pleasure to propose the election as an honorary member of Mr. W. Standford, of Newport, for services rendered. He had helped them on many occasions, and in addition he was one of the colleagues of Mr. Canning.

The PRESIDENT seconded this, and it was agreed to.

At the call of the retiring President, the new President, Mr. I. G. JENKINS, of Abertillery, took the chair, and thanked the members for the honour they had done him and for the cordial reception accorded him. He proposed a hearty vote of thanks to the retiring President, remarking that Mr. Ablett had done admirably for the Association during his year of office. Those of them who had been fortunate enough to take part in the visit to Swansea saw that he was held in high esteem by his Directors.

Mr. W. H. JOHNS (Swansea), in seconding, remarked upon the extremely useful character of Mr. Ablett's Presidential Address, which dealt with matters of vital importance on the commercial side of the Industry.

The PRESIDENT then presented Mr. Ablett with a salver, as a memento of his year of office, and Mr. ABLETT suitably acknowledged the gift.

ENCOURAGING THE JUNIORS.

Mr. J. H. CANNING (Newport) then presented examination certificates and prizes to members of the Wales and Monmouthshire Junior Gas Association, but before doing so remarked that they all very much regretted the unavoidable absence of Mr. Gibson, the President of the Institution of Gas Engineers, who would, had he been there, have undertaken this duty. It was a pleasure to refer to the very satisfactory results this year, so far as that district was concerned, in the examinations in Gas Engineering and Gas Supply of the Institution. In all, no fewer than 14 candidates had passed in various grades—four in Higher Grade Gas Engineering, one in Higher Grade Gas Supply, seven in Ordinary Grade Gas Engineering, and two in Ordinary Grade Gas Supply. In view of the comparatively small size of the district, this was a very creditable record, and he thought perhaps that to some extent it might be due to the policy adopted by their Association of encouraging in every way possible the students who were to carry on the work of the Gas Industry in that area in the future, by giving them prizes and assisting them in other directions. The main credit for this policy was due, as always, to their Secretary, Mr. Octavius Thomas, who initiated it. The prize winners were as follows:

For work done for the Wales and Monmouthshire Junior Gas Association:

S. E. Brett	Tonypandy, Rhondda.
R. R. Brown	Cardiff.
J. H. Canning, Jun.	Newport, Mon.
S. C. Chapman	Swansea.
J. S. Prater	,,

For having passed Higher Grade, Gas Engineering:

K. H. H. Langford	Cardiff.
F. D. Thomas	,,

For having passed Ordinary Grade, Gas Engineering:

J. H. Canning, Jun.	Newport, Mon.
F. S. Johns	Swansea.
W. Algate	Porth.
D. W. Rees	Neath.
A. L. Thomas	,,
G. E. Thomas	,,

For having passed Ordinary Grade, Gas Supply:

W. N. Little . . . . . Cardiff.

For having passed City and Guilds of London Institute, Gas Fitting:

J. J. Asquith . .	Newport, Mon .	1st Final and Silver Medal
J. F. Carless . .	,, ,, .	1st Final
W. F. Garraway .	,, ,, .	,,
D. G. James . .	,, ,, .	1st, Grade 2
E. V. H. James .	,, ,, .	,,
F. Jones . . .	,, ,, .	,,
A. Perrett . . .	,, ,, .	Passed Grade 1
J. G. Thomas . .	Cardiff . . .	,, ,,

For having passed Cardiff Technical College, Gas Fitting:

R. H. Walrond .	Cardiff . . .	1st Class, Stage 2
L. Millan . . .	,, . . .	,, ,,
V. Beere . . .	,, . . .	,, ,,
G. O'Donnell . .	,, . . .	,, ,,
E. Wheeler . .	,, . . .	1st Class, Stage 3

Representative on Institution Council.

On the proposition of Mr. J. Stephenson (Aberdare), seconded by Mr. W. Collin (Bridgend), the new President, Mr. Jenkins, was elected to represent the Association on the Council of the Institution of Gas Engineers for the year commencing June, 1933.

Special Purposes Section.

Mr. D. W. Davies (Tredegar) moved the adoption of the 22nd Annual Report of the Special Purposes Section, this being seconded by Mr. A. E. Pask (Caldicot), and unanimously agreed to. The report stated that two meetings had been held, and one of a Sub-Committee. One company had joined during the year; the membership now consisting of ten local authorities and twenty-one companies. The receipts for the year amounted to £43 18s. 2d., and the payments to £34 13s. 1d., leaving, with the balance brought forward, the sum of £53 15s. 10d. in the hands of the Treasurer, with £300 of 2½ p.ct. Consols.

The following paper was then read and discussed.

THE DEVELOPMENT OF TOWN GAS FOR TRADE AND INDUSTRIAL PURPOSES.

By H. D. Madden, M.Inst.C.E., M.I.Mech.E.

When our honoured Secretary requested me to provide a paper for this meeting, the selection of a suitable subject gave me some thought. After passing under review a number of topics, it appeared to me that the vital importance of the development of town gas for trade and industrial purposes claimed the right of place.

As an Association, we have received many papers on carbonizing and other technical sections of the works and distribution systems, the requirements of the domestic load are well-known to each of the members, and although saturation point in the number of appliances per consumer has not been even approximated, yet the development in this direction is along lines familiar in your daily routine.

Modern domestic gas appliances are highly developed, and have reached such efficiencies that where old cookers and apparatus have been changed for modern ones, marked economy in the use of gas has naturally followed. This is equivalent to a reduction in the price of gas per therm, as the consumer receives a lower account for similar cooking operations over an equal period.

This cause and effect has been acting throughout the whole of the Gas Industry in these Isles, and one ventures to say that the full significance of the conversion from old to modern appliances and the extent of its effect on the output of gas for several years past has not been fully realized by our Industry.

It is a phase through which we are passing, and the phase is similar to that of the conversion of flat flame to incandescent lighting. The introduction of the washboiler, water heaters, and many other types of apparatus for domestic use has considerably widened the field, and very much will have to be done before reaching anything like the saturation point in domestic usage. Year by year the total number of gas consumers increase, and this is all to the good, but the domestic consumer uses on an average between 25,000 and 50,000 c.ft. per annum.

Immense Possibilities.

This brings me to the point of the use of gas for trade purposes, and the immense possibilities there are in this field which is practically unexplored. An industrial consumer requires but one service pipe and one monthly or quarterly account, and the quantity of gas that he may take in a year may be considerable indeed. He may equal a hundred or many thousands of domestic consumers. It is evident, then, on the score of initial capital outlay and consequent service charge, as well as for the commodity charge, that he should be able to purchase gas on more favourable terms than the small user, and remembering that the total costs of fuel and heat in industry are enormously more than the cost for power, the question of the price of gas for this purpose should be closely examined.

Oil, coal, and electricity are now making a strong bid for industrial heat requirements, but gas is the ideal fuel for the majority of trade purposes, owing to its flexibility and control of heat, and because it provides oxidizing or reducing atmospheres as needed. Requiring no storage or complicated plant on the consumers' premises, gas has many advantages denied to its rivals, but a charge which is too high will undo these advantages. It is a growing experience for the industrial heat specialist to be called in by firms who are considering any change in their heat treatment processes, and he ultimately reduces the question to the total savings per week or year that can be effected by each of the rival fuels in competition for the business. The manufacturer has no sentiment in the matter. He installs that system which will give him the best financial returns after consideration of all factors—and that is why the gas price factor is so important and should be so carefully examined.

If there be an opportunity for a new outlet for a large volume of gas for an industrial process, then this additional amount will have to be manufactured at the works; and assuming adequate manufacturing plant, the load will require additional coal only, and therefore the cost of coal less residuals can be made the basic figure for calculation of price. The overhead charges, rates, taxes, supervision, &c., remain constant, and any additional load on the works will assist to reduce these charges per therm and per 1000 c.ft.

The Gas Unit.

There is one matter which the writer would like to stress, and that is the mentality of the average buyer of heat towards the terms " therm " and " thousand cubic feet." It will be found that the heat specialist reduces the heat requirements to a common factor of so many B.T.U. per hour, and for this reason one ventures to suggest that more use be made of the term " unit," when dealing with this class of business, because it clarifies the position in the buyer's mind when he is making comparisons between gas and electricity. There are gas undertakings in the area covered by our Association which are selling heat energy at a flat rate as low as one-third of a penny per unit, taking the figure of the gas unit as 4000 B.Th.U., or 25 units per therm. This is a fact which we, as an Industry, might with advantage give more publicity to. We should advise the whole of our consumers of the price we are charging per unit of heat energy. In Cardiff we have done this, and special printed cards announce the fact in showrooms, windows, and offices, and, in fact, in all prominent places where the consumer can readily see and read them. The man in the street can make his own comparisons. Previously the comparison between the therm and the unit was difficult to him—the unit reduces it to simplicity. It is a simple selling point for our salesmen.

The field for the use of town gas in trade and industry is a large one, which does not reveal itself at first glance. Very careful exploration is needed before all possibilities are exhausted of extending its uses. Let us rather recognize that the possibilities have not been realized. Wherever heat is wanted gas may be wanted. Of many towns it has been said " This is not an industrial area, and there is very little opportunity for the development of trade and industrial gas." This statement is untrue. A careful census and examination of the trades carried on will reveal many opportunities where town gas can be utilized for heat treatment, and in a number of cases to the displacement of raw coal.

Take the case of boot repairers. Even a small business would require gas for blue wax and heel-ball, and for ironing and treeing, while larger establishments would include filling, seam treatment, embossing, welting, and seam sealing. Again, local garages can be cited. Gas can be used here for running-in repaired motor engines, vulcanizing, re-metalling bearings, paint burning, brazing and soldering, and, in some cases, spring annealing.

Metal and alloy melting provide openings for gaseous fuel, and there are a number of heat problems arising which can only be worked out by men who have had a practical training in mechanics and allied technical subjects, and who can utilize this knowledge to design and build gas furnaces which will efficiently and economically carry out the operation required by the consumer.

Central Heating.

A new load is developing in the heating of churches and large public buildings, by means of a central heating boiler thermostatically controlled—such as the " Vesta " type—

and there is a large field for development in this direction, as these boilers offer such a number of advantages over many of the existing heating systems.

In so many cases gaseous heat can produce results more cheaply and efficiently than any other type of fuel, and this is the advantage that should be pressed home. The development of the industrial field requires exact knowledge and officials who have good technical experience. They must, however, in addition, possess patience, perseverance, and tact.

In the larger problems of heating—rarely are two problems identical—there is no basic rule as in the case of the supply of cookers, fires, &c., to the domestic consumer. Nevertheless, in the outlet for small trade apparatus, certain standard apparatus can be applied generally for routine trade uses.

The opportunities for town gas in trade and industry is not on all fours with the supply to domestic consumers; it has been shown to be more difficult to find, but it is very remunerative when successfully developed, and it is the load that in the future will assist the development of the Industry. Bear in mind always how considerable additional loads assist to reduce overhead charges and thus reduce the cost to domestic consumers.

The freedom that the electric supply possesses in its powers of charge is denied to the Gas Industry—an inequality that is intolerable and which must be remedied. However, many undertakings have already statutory powers that enable them to quote low prices by discounts for large volumes; and every opportunity should be taken to extend these precedents to the utmost limit. We hope that in time Parliament will give us freedom to quote charges on the same basis as our state-aided competitor—electricity—and when we obtain that concession, our Industry will supply heat energy at a fraction of the cost of our competitor. We should then obtain the bulk of the industrial heating load, since our flat rate in and out is approximately one-third of a penny per unit summer or winter with no restriction as to time or season. Our Industry is elastic in its service, and the experience and development of industrial gas in the undertakings of the United States of America may be cited as an example of the advancement and prosperity of the Gas Industry despite the magnitude of the electricity interests and the cheapness of its production.

Central Organization.

The National Gas Council in its wisdom has given its benediction to a scheme for the development of trade and industrial gas on National lines, and in our own area my Board of Directors have consented to be the central organization for South Wales and Monmouthshire, providing staff, test laboratory, and industrial showrooms. Linking up with the Central Authority, we pool the whole of our experience and disseminate it to contributing members in other areas, to the benefit of the Industry as a whole, thus co-ordinating the results of research and experience of all areas.

A number of undertakings in this area have agreed to contribute and support the Central Industrial Laboratory and Showrooms at the Bute Terrace Works of the Cardiff Gas Light and Coke Company, and this is all to the good of the Industry. Non-contributors cannot expect to receive the aid and assistance of the research work that is carried out at a great expense by private enterprise, and it is only just and fair that those who contribute shall have the exclusive benefit of the efforts to secure a great future for our Industry in the supply of town gas for industrial purposes.

The work carried out at the Cardiff Gas Company's Laboratory and industrial showrooms commences with the examination and testing of all types of domestic consumers' apparatus, examining and proving new types before they are accepted for the consumers' use, also investigating any individual troubles which may occur on a consumer's appliances.

On the larger scale, consumers' trade heat problems are examined, and in many cases experimental furnaces have to be built up and the materials tested practically to determine finally the nature and type of the furnace that will fulfil all the conditions required in the most efficient manner.

Our immediate Past-President of the Institution of Gas Engineers, Mr. Canning, in his excellent articles on "Back to Coal through the Gas Industry" in the "Western Mail and South Wales Daily News," has shown forcibly how trade and industry can benefit by the utilization of gas for heat treatment in the process of "Back to Coal."

In conclusion, I give in an appendix a list of the equipment of the Industrial Showrooms at Bute Terrace Works for the use of gas in trade and industry. This indicates the possible future of the new avenue of gas salesmanship.

List of Equipment in Industrial Laboratory, Bute Terrace Works, Cardiff Gas Light and Coke Company.

1 12-in. by 9-in. by 9-in. Incandescent Heat Company low-pressure natural draught furnace (up to 1000° C.).
1 Type "A" British Furnaces oven furnace (15 in. by 10 in. by 6 in.) up to 1500° C.
1 Type B.1 British Furnaces rivet heater.
1 3-ft. by 2-ft. by 1-ft. Richmond oven furnace (gas and air blast).
1 Natural draught tempering oven.
1 Brayshaw salt bath furnace.
1 Wilkes gas and air blast high-speed steel furnace.
2 Cox's surface combustor blocks.
1 Dean sterilizer.
1 Crisp range, Davis burner.
1 Brayshaw natural-draught crucible furnace (10 in. dia. by 20 in. deep).
1 Main baking oven.
1 200,000 B.Th.U. "Vesta" boiler.
1 12-h.p. Morris engine with dynamometer for experimental purposes.
1 Keith-Blackman belt-driven gas compressor at Melingriffith.
2 Fletcher Russell small crucible furnaces.
1 Wilkes brazing hearth.
6 Shoemakers' tool heaters.
1 British furnace burner.
1 Wilkes soldering iron heater.
2 Fletcher blowpipes.
1 Wilkes bench furnace.
1 Bryan-Donkin air compressor (small).
1 60-lb. crucible.
1 30-lb. crucible.
Tempermelt fusible salt.
Pyromelt fusible salt.
1 portable pyrometer equipment (0°-500° C.) (500°-1500° C.).
2 "Progas" governors.
1 "Newell" governor.
1 Sugg's governor.
1 Shop-made bitumen pan and rail burner.
1 set 22-in. roll heaters.
2 Keith gas and air compressors.

Discussion.

The President, Mr. I. G. Jenkins (Abertillery), said that Mr. Madden and his Company were to be congratulated on the steps taken during the past few months in setting up an industrial centre and demonstration room displaying various industrial apparatus. They would have noted from the paper the large number and wide variety of gas appliances already in use. An efficient technical staff was available for the service of contributing undertakings, to discuss and advise upon the merits of gas as compared with other forms of heating; and data were tabulated and supplied of various processes of heating. No undertaking, however small, could afford to be outside such a scheme; and they all appreciated the assistance which Mr. Madden and his Company were always ready to give to the smaller undertakings. They had the welfare of the Gas Industry at heart. One suggestion in Mr. Madden's paper was worthy of special note—his reference to the taking of a census. If they tackled this suggestion, and made a careful survey in their own areas, he was sure they would find many prospective consumers. They might not be large, but what of the man who used the soldering iron, melting of brass, heating of greenhouses, churches, &c.? Surely these were possible avenues to increase the load. Every therm counted, and generally assisted in reducing overhead charges, &c. Mr. Madden had suggested adopting a gas unit for comparative purposes with their competitor electricity. This was a very simple, yet valuable, proposition. They must endeavour to get every one of their employees—from the youngest to the oldest, those engaged on manufacture, as well as distribution in this and the other sides of their great Industry. The men who came into contact daily with consumers must be determined to keep a watchful eye for new business. It was realized that, during these days of trade depression, and especially in some of their mining valleys, it was difficult to increase the output; but, with grit and determination, and a good sales policy backed up by "service," much was possible. He had recently arranged for a canvass for domestic appliances in his own area, and most of them knew how much depression there was in the Western Valleys. Yet he was amazed at the results achieved by his fitters.

Mr. P. S. Hoyte, being called upon, said he had had a long-standing invitation to attend one of their meetings, and he was happy now to be able to do so. He thought the oldest, and certainly the best, friends he had made during his long life in the Gas Industry were members of that Association. His pleasure at being present had been increased by listening to Mr. Madden's paper, which would enable the members to plan out the future with regard to sales of gas for industrial purposes. He was glad to note that the author emphasized the necessity of adopting the unit system as a selling point. Such a system must prove of enormous benefit. A figure of (say) ¾d. per unit for electricity looked very cheap when compared with

(say) 6d. per therm for gas; and this had an effect upon the consumer.

Seeking the Industrial Load.—Join Up!

Mr. W. Clark Jackson (Neath) said he happened to be Hon. Secretary of the Industrial Committee who were collaborating with Mr. Madden and the Cardiff Gas Company. The paper had pointed out very definitely the value of this industrial centre. He (the speaker) would once more earnestly appeal to those who had not yet decided to become contributory members of the scheme to join up. It was not fair to expect that experience paid for at a rather high price by the Cardiff Gas Company and their staff, and the contributing members with their staffs, and all the other industrial centres up and down the country, should be disseminated among people who were contributing nothing in any shape or form. He urged outstanding members to advise their Boards of Directors or Committees to join the scheme. It was a scheme of absolute necessity to the Industry. There would come a time when all of them would have to look after the industrial load, and unless they had behind them the experience gained not only at this centre, but at all the other centres, there would be not much hope of making a thorough success of gas for industrial uses. He agreed with Mr. Madden that manufacturers had no sentiment in the matter of industrial gas. If they could not put up a proposition which was going to show a saving to the manufacturer, they might as well leave the thing alone. In conclusion, he appealed for all possible support of the Cardiff Gas Company in their enterprise in connection with the Engineering Exhibition which would take place in Cardiff in November. The Company had taken a large space to give publicity to gas as an industrial fuel.

Of National Importance.

Mr. Ross Taylor expressed regret at the enforced absence of Col. Ogilvie, Mr. Fottrell, and Mr. Smith, of the National Gas Council, and went on to say that he thought South Wales was to be heartily congratulated on having at the head of this industrial gas movement men who not only possessed knowledge, skill, and energy, but had the breadth of vision to see that this matter was not one which concerned the Gas Industry alone. It was, indeed, of vital importance to the coal industry, and therefore it was of national importance. There was a very considerable amount of misapprehension as to the true position between the Gas Industry and the coal industry. The coal owners had been given almost absolute control of output, price, and so on, and the policy so far had been to raise the price against the home consumer, and the public utilities. They should remember, however, that the Gas Industry, who were such large purchasers of coal, must reduce the price of gas as far as possible, if they were going to offer attractive terms to the industries. The great menace which the coal industry had to face was the menace of oil. The country was tending more and more to become an oil-burning country. Apart altogether from oil for bunkers, the quantity of fuel oil imported since 1913 had increased 400 p.ct. This invasion of oil was still going on. Oil was cheap, and appliances for its use were being improved in every way. Now, it was undoubtedly true that raw coal for a great number of purposes, domestic and industrial, was out of date. It could compete with oil only if transformed into gas, electricity, or something else. The battle was against oil, and any increase in the price of coal made the fight stiffer. To-day, with coal at its present price, gas undertakings here and there were losing business to oil, and he hoped the coal industry would realize that, in this big movement to develop the use of gas for industrial purposes, they had a chance not only of helping the Gas Industry, but of helping themselves. The contention he was putting forward was very strikingly borne out a few months ago in a speech made by Dr. A. E. Dunstan, Chief Chemist to the Anglo-Persian Oil Company, at a gathering of the Coal Trade Luncheon Club. In the course of this speech, Dr. Dunstan said: "My considered opinion is that the solution of your difficulties will be in the complete gasification of that coal which is not directly burned for power production. I am authorized by Sir John Cadman [his Chairman] to point out that this question of gasification of coal is, in his opinion, a matter of great national interest. He feels that the Gas Industry, restricted as it is by close specifications imposed by Parliament, is unfairly handicapped in its endeavour to produce a convenient, economical, and effective fuel."

The President remarked that the members would like to have a few words from Mr. Rogers, who knew all about what was being done in Birmingham.

The Price Factor.

Mr. R. J. Rogers said that for very many years past the handling of industrial problems in Birmingham had been undertaken by a special department. Unfortunately it had not during recent years fallen to his lot to take any very active part in connection with the development of industrial uses of gas, though being closely associated with those who were carrying out that work he had naturally followed matters with keen interest. There was one point in the paper which he thought every engineer should keep clearly in mind—the price factor. Now, the price factor did not always mean the actual price of gas per therm. No doubt all of them could recall many instances in which, on a comparison upon a price-per-therm basis, gas would never have had an opportunity of being used, but when other considerations—such as saving of metal, labour, time, &c.—were taken into account there was an advantage shown in favour of gaseous fuel. When all these matters were taken carefully into account, much business might be obtained for which, on the mere price-per-therm basis, gas engineers would hesitate to compete.

A Uniform Unit.

The gas unit was a matter which should most certainly be regarded from a national standpoint. In various parts of the country a gas unit was being used by engineers, and it seemed to him regrettable that this should be taking place without some uniform standard being adopted by the Industry. There was danger in that course, and while no doubt there were certain difficulties he did feel that the sooner some definite decision was arrived at by the Industry as a whole regarding the unit to be adopted, the better it would be. It was gratifying to know that in that area it had been decided to undertake research in a manner similar to what had been done in Birmingham. For many years past he had seen the great advantage derived, not only in the vicinity of Birmingham but much farther afield, from the close research thus undertaken in connection with heating propositions, and he was quite certain that, as time went on, any money and effort that were now being devoted to the research station in Cardiff would be reflected over the whole of that area. Apparently this method of sending out information from laboratories was the only way in which the industrial heating problem could be tackled. He was glad to notice that the station at Cardiff would not only deal with matters relating to the industrial use of gas, but would also be available for engineers to receive information with regard to domestic appliances. He had recently transferred his services from one branch of the industry to another, and he did know that in the case of certain undertakings there was a lack of knowledge as to what various appliances were capable of doing. At the same time, he realized that it was quite impossible for every gas undertaking to be equipped with the necessary apparatus for obtaining such information as they ought to have. Therefore this centre at Cardiff would prove most helpful to gas engineers, not only on the industrial side, but also in connection with domestic appliances.

Price Stability.

Mr. J. Stephenson (Aberdare) remarked that the author said gas was the ideal fuel, and no doubt they all agreed with this. At the same time, however, he was pleased to hear Mr. Ross Taylor mention the question of oil, which was in all probability the next most flexible means of providing heat. It could not be too strongly stressed in a district of this character that there was some reason why gas should be used instead of oil. The district covered by their Association was dependent almost entirely upon the prosperity of the coal industry, and the people ought to have it pointed out to them very forcibly that the actual amount of money represented by their fuel account was not the whole story. Another point which should be emphasized was that with gas there was some stability as regards price. With oil the customer was very largely in the hands of combines, and the price could be varied without any warning—as, indeed, they had recently experienced in the matter of petrol. When a price could vary practically 20 p.ct. between night and morning as in the case of oil, gas had a definite advantage.

Cost the Great Question To-Day.

Mr. W. H. Johns (Swansea), proposing a hearty vote of thanks to Mr. Madden for his paper, said he would like to take the opportunity of emphasizing the point that had been made with regard to the adoption of a gas unit. This was an important matter, and one which, if it could be settled, would be instrumental in solving many of the difficulties which arose among prospective consumers as to comparative costs of available fuels. He would like to suggest that, when such a unit was adopted, it should be exactly the same as the electrical unit. If they adopted a unit of 4000 B.Th.U., and compared it with the electric unit of 3412 B.Th.U., confusion would be still with them, and on some future occasion it might be deemed necessary to change to a unit of 3412 B.Th.U. If they could avoid any confusion of this kind, it would be far better to do so. No doubt the future of the Industry was largely linked up with the progress that could be made in the application of gas to industrial purposes; but speakers that morning seemed to think that this was a new subject, whereas really it was an old one. In Swansea they were supplying gas to many places of the character referred to by the author. Was it expected that those who were taking large quantities of gas should be charged at a new industrial rate, when the gas undertakings were today obtaining this business at a higher rate than might possibly be procurable for some of the bigger installations contemplated in the paper? During the war gas proved itself to be a very admirable servant at the various factories where it was employed, but at that time the question of cost did not enter into the calculations of manufacturers. They wanted fuel, and so long as they could get it they did not mind the price. But that experience did prove that gas was an ideal fuel, and it was used for practically every heating purpose hinted at in the paper for future development at a low price. To-day manufacturers knew that gas could be applied satisfactorily; the great question was price, and this was for each undertaking to work out for itself. With regard to the price at which gas could be economically offered by those works possessing at present surplus plant, he would like to point out that the time would arrive when the capacity of the works would be fully occupied, and capital outlay would be called for—perhaps not only for new plant, but for enlargement of the distribution system, in order to supply gas at the required pressure to the various industries. If the factories were scattered, this would introduce a big problem. The fact that one might sooner or

later have to face greatly increased capital charges must be borne in mind before one could definitely give a low figure for a gas supply for industrial purposes.

Adoption of Oil a Bad Policy.

Mr. J. H. Canning (Newport) said it was a great pleasure to second the vote of thanks. They were all very grateful to Mr. Madden for adding one more to the practical contributions he had made so often in the past to the proceedings of the Association. They ought also to express their gratitude to the Chairman and Directors of the Cardiff Gas Company and Mr. Madden for the enterprise they had shown in establishing this splendid laboratory, which was going to be of the utmost benefit to every gas engineer in this area. He would like warmly to support the appeal which Mr. Jackson had made to those undertakings not at present contributing, that they should join up. They ought all to back up a Company who were endeavouring to do the best possible for them. The contribution was very small, and even the smallest undertaking would more than recoup the money paid in the results obtained. It was a bad policy for industrial undertakings in that area to adopt oil as a fuel. Whatever small advantages they might derive by so doing would be more than counterbalanced by the harm done to the industry on which that district mainly relied—namely, coal. Small commercial considerations in such a case should give place to local patriotism.

Mr. Madden, in reply, said the paper had been very well discussed, and this was what he had wished. He wanted to ascertain their views. This question of the development of gas for industrial purposes was, as Mr. Ross Taylor had said, vital. It was true there were factors which each one must consider for himself—but in the broadest possible way. It was a fact that gas was used largely during the war, but he could name big consumers who adopted it at that time, but who, as soon as the war was over, reverted to coal, because coal was cheaper. At the time of the war the question of the use of gas for industrial purposes was not properly studied, and there was no question of efficiency. To-day in the laboratory they were cutting down heat losses and increasing efficiency in every way. It was in this direction that they must look. As to the gas unit, he quite agreed that it was necessary to have a universal one. The reason he supported the unit of 4000 B.Th.U. was that the matter was discussed at a Council meeting of the Institution, when it had been referred to them by the National Gas Council, and he thought he was correct in saying that the Institution went very carefully into the question, with the result that they advised the National Council that a satisfactory figure would be 4000 B.Th.U., or 1-25th of a therm. They might take it that the matter was fully sifted before the 4000 B.Th.U. was arrived at. With reference to what Mr. Ross Taylor had said as to the value of the Gas Industry to the coal industry, it should be pointed out that the former was of great value to the latter in that it took its supplies regularly day in and day out. The Gas Industry ought, too, to receive every support, not only from coal owners but also from the railway companies. The Gas Industry furnished haulage to the railway companies, both in and out—the coal being taken into the works, and coke and other products being taken out. From this it would be seen that the interests of the Gas Industry, the coal industry, and the railway companies were bound up together.

It was left to the Council to decide upon the place of the next meeting.

Luncheon.

At the close of the meeting, there was luncheon at the Esplanade Hotel, with the President in the chair. The toast of "The Town and Trade of Porthcawl" was proposed by Mr. Canning, and responded to by Councillor Davies. After Mr. Hoyte had presented the Golf Cup to the winner, "The Wales and Monmouthshire Association" was submitted by Mr. Ross Taylor, and replied to by the President.

Golf Meeting.

On the Wednesday, the Golf Meeting was held on the Links of the Royal Porthcawl Golf Club, in perfect weather. The arrangements were well made by Mr. J. Sadler, and the following were the best scores:

R. R. Bird	85— 7—78 (cup)
F. W. Richmond	87— 5—82
W. Ross Taylor	94—12—82
H. E. Bennet	95—12—83

A substantial sum was obtained for the Benevolent Fund of the Institution of Gas Engineers.

In the evening, there was a well-attended informal dinner in the Esplanade Hotel, the enjoyment of which was enhanced by an excellent musical programme—the items being rendered by Miss Sadler and friends.

A letter was read from Mr. A. Littlewood, of Ye Pirates' Club, announcing the election to honorary membership of the Club, during their stay, of all who had assembled in Porthcawl on the Association's business. This thoughtfulness was much appreciated, and many of "ye bande of gas makers" did duly proceed to make, or to renew, acquaintance with "ye pirates' haunte." Those who did so, found themselves in full agreement with the motto above the door—"'Tis better to smoke here than hereafter."

Domestic Smoke Problem: Possibilities of Coke Oven Fuel*

By R. A. Mott, M.Sc., F.I.C.

The smoke pall which overhangs most of our large cities can be attributed for the greater part to "domestic" smoke. Indeed some authorities assess the proportion to be ascribed to "domestic" chimneys as high as two-thirds, and it is clear that no marked progress towards the abolition of the smoke nuisance will be possible until means are available to prevent the production of smoke from house chimneys. Domestic smoke is produced from an enormous number of small units, of the order of 8 million, which can only be influenced by a radical change in the method of using fuel. The abolition of domestic smoke would be an important step towards improving the health of mankind and the amenities of living.

Duties of Coal Fires.

It is estimated that about 40 million tons of coal are used annually for domestic (house) purposes. With 8 million houses, this is roughly equivalent to the use of an average of 2 cwt. of coal per week throughout the year in each household. Actually there is a seasonal variation in the demand for coal, more being required in the winter than in the summer. It is convenient to divide houses into different types according to the different duties which domestic fuel has to perform—namely, the small house in which one room is usually used as a "living room," the medium-sized house in which a dining and sitting room as well as a kitchen are used regularly, and large houses in which a number of additional rooms are used occasionally and numerous bedrooms are available.

In the small house the amount of money available for house heating, cooking, water heating, and clothes drying is strictly limited, and the most economical method of meeting these requirements has to be adopted irrespective of the thermal efficiency with which each duty is performed. The coal fire is still the commonest fuel using unit for performing these duties, but it is now doubtful whether it is the cheapest. A coal fire fitted with a back boiler, and connected to an oven, can be used to warm the room where it is installed, can meet most of the requirements of cooking, can provide hot water for washing dishes, and, with extra stoking, hot water for baths. With its intense radiation, it dries clothes quickly and provides (when not used for clothes drying) a bright cheerful centre for the family circle. Moreover it performs an important function in ventilating a room, the air of a room being changed several times per hour. It is because the coal fire can be adapted for so many uses that it has become so popular. The thermal efficiency with which these duties are carried out is not high, as may be seen from figures obtained by Barker[1] as follows:

Ordinary Brick Set Kitchen Ranges.

	P.Ct.
Heat communicated to food	3
Heat communicated to hot water supply	7
Absorbed in the brickwork	35
Loss in the air of the kitchen	30
Lost in the flue gases	25
	100

A boiler designer wishing to obtain a high thermal efficiency for the use of his coal would see that the combustion of coal were complete before he allowed the flames to come in contact with cold surfaces, and the back boiler of an ordinary range is thermally inefficient because this is not allowed, since the space permissible for a fireplace, and the nature of coal, preclude this. Coal may be considered to yield on heating 30 p.ct. of "volatile matter" and 70 p.ct. of coke. The "volatile matter" consists of

* From a paper before the National Smoke Abatement Society, Newcastle-upon-Tyne, Sept. 24.

[1] Tests on Ranges and Cooking Appliances. Fuel Research Board Special Report No. 4.

one-half gas, one-third tar, and one-sixth water. The gas, because of the restricted space of a fireplace and the drastic dilution with air, is only partially burnt; the tar is still less efficiently consumed and is the cause of most of the smoke produced, while the water has no heating value.

The entirely-closed stoves, commonly used on the Continent for domestic heating, cannot meet all the requirements of the small householder in this country, although they are more thermally efficient because the products of combustion are less drastically diluted with air and combustion is more nearly completed. In the damp atmosphere of this country, which, with low temperatures, has such a chilling effect on the skin, the use of direct radiation such as is obtained from a bright open fire, or a modern gas fire, is comfortable. In the opinion of the writer, the sentimental attachment to an open fire is, to a large extent, a psychological effect associating comfortable warmth after exposure to a chill damp atmosphere with the chief characteristics of the open fire—namely, its cheery brightness; for there is no demand for a bright radiating surface in summer, even when the sun does not shine, provided that the temperature is high enough. If, therefore, a sufficiently high temperature can be maintained in a house, the same need for a bright radiating surface does not arise. It is not, however, the intention of the writer to argue that an open fire with its radiation is not desirable, for it has been shown, for example by Sir Leonard Hill, that short-wave radiation obtained from a very hot surface, such as one of the newer types of gas fire, has a stimulating effect on the skin. The lower temperature of an electric radiation has not the same effect, but radiation from a bright coal or coke fire may be expected to have a similar effect. It may therefore be concluded that a fire which can be seen and can radiate heat directly into a room is desirable.

The cooking duty which a coal fire is called upon to perform is the least satisfactorily carried out of all the duties. The disadvantages of a coal-fired oven are indeed recognized by the housewife as is shown by the rapid adoption of gas cookers in recent years.

Use of Oven Coke in a Small House.

The water heating thermal efficiency of a small coke boiler has been found to be 40 to 50 p.ct. The efficiency is therefore at least twice as high as the best type of back boiler of a coal-fired kitchen range.

The coke boiler may be adapted for using the waste heat for cooking purposes. In one adaptation an oven surmounts the small coke boiler which is about 2 ft. 6 in. high, the waste gases from the boiler being passed through a series of flues round the oven, which has a flue pipe fitted to the top. The maximum temperature required in an oven—for example, for roasting—is only 500° Fahr. and by suitable insulation there should be no difficulty in maintaining this temperature. By the admission of air to dilute the flue gases a lower temperature can be obtained.

Another variety of coke-fired oven has the oven alongside the boiler giving an extended hotplate area at one level. Dr. Fishenden[1] records that "for all-round efficiency no other ranges on the market are to be compared with these of independent boiler origin, especially where the demand for hot water is high. . . . Where the oven is at the side of the fire, the adequate provision of boiling rings renders the range capable of meeting the entire cooking demands of an average household."

The development of this type of appliance should go far to meet all the requirements of a small household at present met by a coal-fired range. With a suitable size of coke, an open fire can be maintained, and therefore the appliance should supply hot water, perform all the cooking operations, and give a cheerful red fire. No variety of closed stove, however, gives the same rapid clothes-drying service as an open, unenclosed fire, for the radiating surface is restricted and the radiation is confined to a small area at a low level, in front of the fire. This disadvantage may, however, be overcome by the use of a clothes-drying rack suspended from the ceiling, and a longer time allowed for the drying operation. Rapid clothes-drying is possible over a restricted area immediately in front of the fire, and requires frequent changing of the position of the clothes. Some makers of closed coke stoves arrange for the top of the boiler to be raised and so allow radiation from the fire at higher levels. On the whole, the disadvantages associated with the enclosing of the top of the stove are outweighed by the advantages in increased thermal efficiency which allows a real economy in use. The open fire cannot be efficient for water heating and cooking operations so long as unrestricted dilution of the products of combustion with excess air is allowed, and this can only be controlled by enclosure of the top. The design of these "closed" stoves is worthy of serious attention to make them the most suitable for the small house. The balancing of the size of the boiler and the insulation of the oven and the amount of heat radiated from the open fire to meet the requirements of the small house should make this appliance an economical, pleasing, and reliable unit.

[1] House Heating. London, 1925, p. 142.

Use of Oven Coke in Medium and Large Houses.

In larger houses, economy is not always so important as convenience, and there can be no doubt, in the writer's opinion, that cooking operations can be performed most satisfactorily by a gas cooker. The balancing of the different requirements of hot water production, cooking, and open fire radiation is admittedly difficult; and there is no doubt that each operation is more satisfactorily carried out if independent units and controls are used. The most satisfactory method of raising hot water is undoubtedly to use an independent coke boiler, and this can be conveniently placed alongside a gas cooker. This arrangement would not preclude the fitting of an oven to the coke boiler and using this for auxiliary use, a feature which would often obviate the use of the gas cooker for small cooking operations.

In a medium-sized house the operations formerly carried out by a kitchen range can be more conveniently and efficiently carried out with a combination of a gas cooker and an independent coke boiler, both being under exact control and each rendering a service independent of the other. The conversion of a kitchen range to this arrangement may be carried out very cheaply, and is the method adopted in the writer's house.

The coke boiler is charged with oven coke nuts of $\frac{3}{4}$ to $1\frac{1}{4}$ in. or 1 to $1\frac{1}{2}$ in. size and gives a bright cheery open fire and supplies hot water for all domestic requirements with great ease. The size of oven coke used is a most important factor; with oven coke of 1 to 2 in. size, the fire was not regularly bright and was liable to go out several times a day. With coke of $\frac{1}{2}$ to $\frac{3}{4}$ in. size the boiler could be kept in all night, but since it can be so easily lighted by a gas burner, it is allowed to go out each night. Oven coke nuts is a most satisfactory fuel to use for a small coke boiler, for it is denser than gas coke (a bucket of oven coke nuts holding 13 lbs. compared with only 11 lbs. for gas coke) and burns more slowly—that is, it is less reactive. With gas coke it was more difficult to control the operations of the boiler with the front doors of the boiler open, the gas coke burning more rapidly and the safety valve blowing frequently. With the right size of oven coke the fuel can be burnt sufficiently slowly to maintain a bright open fire and give sufficient hot water for domestic requirements, while, with a big demand for hot water, the front doors can be closed and the damper opened to increase the rate of combustion and production of hot water. The amount of coke used per day in winter is about 25 lbs. keeping a bright fire for at least 12 hours, a rate of 2 lbs. per hour compared with 3 lbs. of coal per hour used in a kitchen range. The fire is lighted by filling the pot completely with coke, opening the damper fully and the ash pit opening about 2 in., and putting a gas burner between the bars for about 20 minutes.

The burner is then removed, the front doors closed, and a fire bright to the top is available in a further 40 minutes. The front doors are then opened and remain so throughout the day, except in special circumstances. No clinker is formed and the ash is poked out at intervals during the day, the ash pan being emptied once or twice daily. In the summer the front doors of the boiler are kept closed, since no heating of the kitchen is required, and a plentiful supply of hot water is produced without raising the temperature of the kitchen uncomfortably. The top of the boiler is used as a hotplate and, by removing the top charging cover, pans may be boiled rapidly without covering them with soot or tar. Toasting can be efficiently carried out in front of the fire. With a combination of gas cooker and coke boiler, all cooking operations are carried out without discolouring the outside of the pans and kettles, and the housewife can discard her heavy cast iron pans and kettles and use aluminium or light enamel, which can be kept as clean outside as inside.

The boiler is fitted with two draw-off cocks and any deposit in the boiler can be run off at intervals. This is indeed an important feature of the independent boiler when the water is hard or is not perfectly clean, as is the case of the author's house served by a main which has only a small service demand and a fine suspension of rust is present in the water. This suspension formerly fouled the back boiler of the kitchen range until it cracked, while the hot water was brown when the fire was much used. By running off the brown deposit at intervals the hot water is perfectly clean, however hot it is.

A further use for oven coke in a medium or large house is for central heating. No one who has experienced the comfort of a house which is centrally heated in winter would like to be without an installation. In the writer's house a separate coke-fired boiler in the kitchen supplies

heat to a sitting room, dining room, four bedrooms, a hall, and upstairs landing, while the heat from the central-heating boiler in the kitchen enables the domestic coke boiler to be operated at a lower rate, and the bathroom is kept warm by the hot water cylinder, always full of hot water. The piping was put in after the house was built, but little difficulty and no serious disadvantage arose in fixing it. With a series of seven radiators and the hot water pipes, the whole of the house, except the sitting room and cellars, is maintained at a temperature of about 60° Fahr. throughout the day. The sitting room, approximately 20 ft. by 14 ft., is kept at a temperature of 50° Fahr., so that the further heat required may be supplied by an open fire.

The central heating boiler is fitted with a thermostat or temperature regulator which maintains a desired temperature of the hot water leaving the boiler.

The size of coke used in the larger boiler is not so important as in the small boiler, but is still an important factor. Oven coke nuts of 1½ to 2½ in. or 2 to 3 in. are used, such a size rendering the building up of the coke charge to the top of the pot a simple operation and being less liable to form clinker. When using the same size of coke as in the smaller boiler—namely, 1-1½ in.—clinker is formed at a lower rate of combustion, and this increases the attention required. With coke nuts of 2-2½ in. size the ash of the coke is removed as fine ash for low rates of burning, but, at the fastest rate, the ash fuses into small particles of clinker, still small enough to riddle through the fire bars. With the 1-1½in. size of the same coke the faster rates of combustion used would give a sheet of clinker which would have to be pulled out through the charging door. The size is therefore important in controlling the ease of operation. It is also desirable that the ash should be heavy. The author has used two cokes of approximately the same ash content, one of which would give after burning overnight a depth of ash of about 4 in., but the other would give a bed of 3 in. With the shallower depth of ash the water temperature does not drop as much.

The coke consumption varies with the outside temperature, the house temperature being maintained fairly constant. The lower the outside temperature the more coke has to be burnt to meet the heat losses through the walls and windows. The whole of the coke fed to the boiler was weighed during the month of January, 1932, and the temperature was noted in each room and outside the house 4 to 6 times during the day. The average result of these operations is that 50 lbs. of coke had to be burnt per day to raise the temperature from 43° to 59° Fahr. When the outside temperature was as low as 32° Fahr. the amount of coke burnt per day was about 60 lbs., though the temperature of the house would fall to about 56° Fahr., and when the outside temperature was 50° Fahr. the amount of coke burnt per day to maintain a temperature of about 60° Fahr. fell to about 25 lbs. per day. With coke at 30s. per ton the cost is therefore about 9d. per day, but this expenditure saves the use of a fire in the dining room, and reduces considerably the amount required for the open fire in the sitting room. Moreover, gas fires in the bedrooms were not used much except on chilly mornings when, the temperature falling to about 50° Fahr. (the windows being open), the fire would be used for a short period.

The heat required to heat the house has been calculated to be approximately 20,000 B.Th.U. per hour, and with the average use of 2·08 lbs. of coke per hour, approximately four-fifths of the heating value of the coke is usefully employed, a very high efficiency for a domestic heat-using appliance. The installation was designed to raise the temperature of the dining room, hall, landing, and one bedroom (used as a children's playroom) from 40° to 60° Fahr., the rest of the house being warmed from 40° to 55° Fahr. The average winter temperature in England is about 40° Fahr., so that by designing the installation to meet average conditions the initial cost is kept lower.

Calculating from the period each fuel-using appliance was used to a normal year the expected fuel consumption would be:

Coke for small coke boiler (domestic hot water, kitchen heating, and hot plate use) for 12 months (12 to 15 hours per day)	3 tons 5 cwt.
Coke for large coke boiler (central heating) for 7 months (24 hours per day)	3 ,, 5 ,,
Fuel for sitting room open fire (small) for 8 months	1 ton 0 ,,
Total	7 tons 10 cwt.

Since oven coke costs at least 2s. a ton less than house coal, it is to be expected that no greater running cost will result under the new conditions, and the expenditure will be limited to the initial cost. Under the new conditions of using fuel, however, a much greater standard of comfort is obtained.

The benefit of centrally heating a medium-sized house may be summed up as follows: There is less restriction in moving about a house and in occupying a greater proportion of each room; there is no discomfort in entering cold bedrooms, and the dining table and chairs need not be brought close to a fireplace, and fires in rooms partially centrally-heated need not be lit so early. Cold draughts are almost abolished, for air entering rooms from a hall is as warm as the air in the rooms. The comfort of a centrally-heated house has to be experienced to be appreciated to the full.

The cost of installation in a medium-sized house is about £50 to £75. Coke-fired boilers are entirely smokeless and a centrally-heated house with a separate coke boiler for domestic hot water and a small coal fire in one room produces very little smoke. Indeed, it can be made entirely smokeless. It is an advantage, in the writer's opinion, to have separate units for central heating and domestic hot-water production. It is possible to use only one boiler, but this would have to be maintained in use all the year round to produce domestic hot water, while, with separate boilers, the central-heating installation can be out of action for at least 5 months of the year. Moreover, with a single boiler, a double hot-water cylinder has to be used, the inner cylinder being for domestic hot water which heats the water in the outside cylinder for circulation in the radiator system. With severe demands on domestic hot water the central-heating system is starved and excessive hot-water supplies may be produced when a higher temperature in the central-heating system is required. The cost of the installation of the two systems is about the same, so that the advantage remains with the separate installations.

In large houses with long corridors central heating is really indispensable and the system follows the same line as in a small house, except that the coke boiler is usually placed in a cellar or outhouse close to the coke store.

Coke Fires.

In recent years considerable attention has been paid to the design of firegrates to burn coke in an open fire for room heating. High-temperature coke (oven and gas coke), being less reactive than coal or low-temperature coke, cannot be burnt successfully in a well grate. To conserve the heat of the fire it should be surrounded by insulating firebrick at the back and sides. To make the utmost use of convection currents to carry heat from one part of the fire to the other, the fire must be fairly deep from top to bottom, so that heat from the bottom of the fire heats up the coke above and enables it to be easily ignited. Instead of having a fire which is deep from front to back (as in a well fire) a coke fire is narrow from front to back. This arrangement requires the use of front bars to support the coke bed. The firebars below a fire may be spaced only ⅜ in. apart for a good coal, but a wider spacing, say, ½ in., is desirable for coke to ensure that a plentiful air supply is distributed uniformly to the whole of the bottom of the coke bed. Another device fitted to some coke grates is a shaker operated by the foot to remove ashes at intervals, so that the air supply to the bottom is not unduly restricted. Alternatively, a portion of the front bars may be fairly steeply inclined, so that the coke on settling down the bars has the outer layer of ash detached and the ash falls through the bars. Some coke grates are fitted with a double flue arranged with a damper to control the back flue and using the ordinary canopy to control the front flue. On lighting the fire, the canopy is closed and the back-flue damper opened. This prevents drastic dilution of the products of combustion, which are discharged at a high temperature into the back flue creating a strong draught which enables a bright fire to be attained quickly. A back-flue damper is then partly or fully closed and the canopy opened. On re-fuelling, the back-flue damper is again opened for a short time. The provision of a back-flue allows the use of a small fire which will pick up rapidly. Some of the outstanding coke grates may be briefly described as follows:

The Kaye Grate (C. H. Kempton & Co., Ltd., 72, Bennerley Road, Wandsworth Common, S.W. 11) has three horizontal grate bars at the front to enable a bed of coke about 6 in. deep to be built up. The bottom firebars are partly horizontal and partly inclined upwards towards the back, the slope of the inclined portion being continued by a fireclay slab to reach the back. Combustion being mainly at the front of the fire, the partly-sloping base of the fire helps to bring fresh coke to the front. The firebars have wide spaces and are attached to a rocking bar which can be used to discharge ash into the pan. The fire is lighted by means of a gas burner fitted as a standard with the grate, air being admitted under the fire for this purpose. The writer has seen a Kaye grate burning "unreactive" Durham foundry coke nuts with ease, giving a brilliantly red glowing fire of the most cheerful appearance imaginable. Those who admire the cheerful coal fire will

find that a coke fire in a suitable grate is still more cheerful with bright blue flames burning above.

The Peveril Grate (Messrs. R. Russell & Sons, Ltd., Peel Foundry, Derby).—This is a well grate fitted with a special "coke valve" connected with a flue behind the normal fire back. By closing the canopy and opening the coke valve, a strong draught is produced and the coke fire is lighted by a fitted gas burner. When the fire has burnt through, the coke valve is partly closed and the canopy opened. The fire will recover on re-fuelling in a very short time, even if very low at the time of re-charging.

The Waverley Grate, made by the same firm, is similar to the Peveril, but is a cheaper production.

The Santore Grate (Messrs. Newton, Chambers, & Co., Ltd., Moorhead, Sheffield).—This grate has steeply inclined front firebars and a second flue behind the fire brick, controlled by a damper. With the canopy closed and the back-flue damper open, air travels down through the fire and the products of combustion pass up the back flue. When the fire has burnt through the back flue damper is partly closed and the canopy opened. The coke slides down the inclined grate bars discharging its ash.

The Eagle Grate (Messrs. John Wright & Co., Essex Works, Birmingham).—This grate has inclined firebars with front bars to enable a deep bed of coke to be built up, and is lighted by a gas burner. Like all coke grates it has firebrick surrounds at the back and sides, but these are kept particularly hot by the admission of air through spaces between the surrounds and the firebars, this being an important factor in maintaining combustion. The performance of this grate in practice is very good.

The Metro Grate (Messrs. Sidney Flavel & Co., Ltd., Leamington).—The Metro grate has (1) bottom grate bars which are inclined from the front to the back of the grate at an angle of 30° to the horizontal and are widely spaced, (2) front grate bars to build up the fire, (3) a firebrick surround, and is lighted by gas. The Metro grate is supplied in a large variety of models, with complete installations and adaptations for existing grates. The Metro basket grate used for coke is a particularly pleasing production.

Radiant Efficiency.

Although a deep fuel bed is used with coke fires, the fuel consumption is not high, being 2 to 2½ lbs. per hour. The deep fuel bed has the advantage that, on re-fuelling, a bright layer of fire is still available for radiating heat. The radiant efficiency of coke fires is much higher than for any other solid fuel fire. Thus, Milner, Dyde, and Hodsman (J.S.C.I., 1931, 50, 113T) have shown that "high-temperature" coke will radiate 33 p.ct. of its heating value into a room, compared with 30 p.ct. for "low-temperature" coke and only 25 p.ct. for coal. By making tests when good fires have been obtained, radiant efficiencies of 40 p.ct. were obtained for high-temperature coke, but a coal fire radiated little more than in the normal test. The high-temperature coke used in these tests was gas coke, but there seems to be little doubt that good figures could be obtained for oven coke. Since coke has a higher radiating efficiency than coal, less of it need be burnt for the same heating service, and economy is therefore realized.

It is desirable that the members of this Society should give a trial to these coke grates, for their wider adoption is dependent on personal demonstration. The cost of adaptation is small, and, the economy in use being great, the capital cost is soon recovered. Members can therefore render a real service to the cause of smoke abatement by installing a grate in their own homes.

The size of coke used in coke grates is usually nuts of approximately 1 to 2 in. size, the nuts of ordinary oven coke being used. But little attention has as yet been paid by the coke oven industry to the production of the most suitable coke for coke fires, but smokeless fuel committees have recently been formed by the different sections of the Coke Oven Managers' Association to consider the question. Some experimental work has also been done at the Fuel Research Station. There is little doubt that the quality of oven coke for coke fires could be improved by reducing its ash content and ensuring that the moisture content was never excessive. Size is likely to be as important a factor as it is in closed stoves. Milner, Dyde, and Hodsman (*loc. cit*) have shown that high porosity is desirable. None of these requirements conflicts with those for blast furnace purposes (the principal use to which oven coke is put). There is too little known about the importance of reactivity to judge its significance for coke fire purposes. According to Milner, Dyde, and Hodsman (*loc. cit*) cokes of low reactivity gave high radiating efficiencies, but the ease of ignition and the time to recover after re-fuelling is important.

Special cokes of high reactivity can be made in coke ovens. The Barrow Haematite Steel Company, Ltd., at their Barrow Collieries, Barnsley, and the Sheffield Coal Company, at Beighton, have produced smokeless fuel of high reactivity by using flue temperatures of only about 700° C. and prolonging the coking time. This is only possible in horizontally flued ovens, those of 21 in. being coked in about 48 hours instead of, say, 32 hours. The product is broken to nut sizes and screened. It is dull black in colour, contains about 10 p.ct. of volatile matter, and is almost smokeless. The writer used this fuel in a sitting room grate in the winter of 1931-32, and could claim during that period that his house was smokeless. The well grate used was not entirely satisfactory, the air spaces in the bottom bars being too small, but, with a suitable size of semi-coke, an excellent bright fire was obtained.

Cokes more reactive than the normal metallurgical coke can be produced by blending coking coal with non-coking coal, but it seems more logical to design coke grates to burn the unreactive cokes at present available.

Future Possibilities.

The vision of the production of domestic fuels in coke ovens to meet all the requirements at present met by coal may be the reality of the future. It is quite certain that increased use will be made of oven coke for domestic purposes without any incentive of Government action, on account of the greater efficiency in use, its smokeless combustion, and its cheapness.

Members of this Society by adopting some of the appliances described in this paper will not only gain comfort with economy, but will have a very real satisfaction in promoting the cause of smoke abatement.

NOTES ON PLANT AND PROCESSES

Modern Illuminating Gas Units.

A very attractive catalogue of modern illuminating gas units for public street and commercial lighting has just been published by Messrs. C. H. Kempton & Co., Ltd., of Stangate House, 225, Westminster Bridge Road, S.E. 1.

The first unit dealt with is the "Kemborn" fitting, examples of which are illustrated in six-light bijou staggered and four to seven light cluster formation. The former is of artistic design, spun in heavy gauge copper, with a vitreous enamel reflector 21 in. in diameter, the flange being 9¾ in. This unit can be fitted with volumetric distance control, cup, and ball, while the siphon tap is standard, being housed in the swan neck. A maximum of 380 c.p. is emitted at an angle of 45° below the horizontal at a consumption of 9·2 c.ft. of gas per hour. This fitting can also be fitted with dual gas supply for reduction of light at midnight. The four to seven light cluster type is suitable for parade lighting and is fitted with white vitreous enamelled arm bracket with adjustable stainless steel reflector.

Another unit illustrated is the "Majestic" ten to fifteen light cluster fitting, which is a suspension lamp spun in heavy gauge copper with vitreous enamelled reflector 30 in. in diameter and flange 13⅞ in. A type of this lamp is also made for upright fitting. Photographs of streets illuminated with these units are reproduced.

The catalogue goes on to deal with accessories for suspension lamps, while there is an interesting note in reference to the subject of illuminating with the aid of reflection. Various types of lantern units for street lighting and conversion sets also receive attention, while the later pages are devoted to outdoor suspension lamps with parabolic reflector—the "Kempto"—indoor cluster lamps of various types, and a poster lamp designed to illuminate indoor posters, corridors, subways, and platforms. Units for factory lighting are also illustrated, while the final sections deal with vitreous enamel steel shades, spare glassware in heat resisting material, and enamelled plates in various finishes for gas cookers.

Gas Companies' Results.

Coatbridge.

The Annual General Meeting of the Coatbridge Gas Company was presided over by Mr. Alex. S. Legat, the Chairman of Directors. In submitting the annual report, he observed that the sales of gas were down, as compared with the previous year, by 84,891 therms. The works and plant generally had been maintained in an efficient state of repair. On the expenditure side of the accounts, he remarked that they had consumed 747 tons less coal at a cost of £504 less, while repairs and maintenance had cost £526 less, and on the total cost of manufacture of gas they had saved £1122. Distribution of gas had cost £168 more, mainly due to repair and renewal of meters. Rates and taxes accounted for an increased cost of £1478. These rates and taxes, he said, accounted for 1·49d. per therm. The cost of management was practically the same as in previous years.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

Quiet conditions prevailed on the Stock Exchange at the commencement last week, but a spirited rally on Tuesday led to intensely active conditions which lasted almost up to the close. Reports from stockbrokers and jobbers intimated that a very substantial volume of business had been put through during the past fortnight, and the settlement last week was one of the heaviest for some time past. The news this week-end is distinctly gratifying, for the agreements reached in the Cotton and other disputes should give an added fillip to business on the new account.

Gas stocks and shares were in good demand, and the tone of the market particularly strong. A number of transactions were recorded at prices above the previous week's best, some of which would appear to justify a further increase in value. For instance, Bournemouth 7 p.ct. changed hands at 144-145, though the quotation remained at 140; Brighton 6 p.ct. preference was sold at 136, the middle market price being 129½; and it will be seen from the Stock and Share List that there are other stocks in a similar position. There were, however, several improvements, and these were headed by Uxbridge 5 p.ct. preference with a gain of 7 points to 109½. Mid-Southern Utility consolidated came next with a rise of 6 points to 94½, which is still on the low side compared with other stocks in the List of a similar nature; and Southampton 4 p.ct. debenture gained 4 points to 94½. On the local Exchange, Newcastle £1 units rose 3d. to 20s. 6d., and it is interesting to note that this price is comparable with that ruling at the present time on the London Exchange—a very rare occurrence, as the local price is usually some few points above that on the latter Exchange.

Current Sales of Gas Products.

The London Market for Tar Products.

LONDON, *Sept.* 26.

The prices of tar products for the current week are as follows:

Pitch, 95s. to 97s. 6d. per ton f.o.b.

Creosote, 3½d. to 5d. per gallon f.o.b., according to specification.

Refined tar is 4d. to 4¼d. per gallon in bulk at makers' works.

Pure toluole is about 2s. 7d.; pure benzole, about 1s. 11d.; 95/160 solvent naphtha, about 1s. 7½d.; and 90/140 pyridine bases, 3s. 9d. to 4s.—all per gallon naked at makers' works.

Tar and Tar Products in the Provinces.

Sept. 26.

The average prices of gas-works products during the week were: Gas-works tar, 33s. to 38s. Pitch—East Coast, 85s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 85s. f.o.b.* Toluole, naked, North, 1s. 7½d. to 1s. 9d. Coal-tar crude naphtha, in bulk, North, 5½d. to 5¾d. Solvent naphtha, naked, North, 1s. 4d. to 1s. 4½d. Heavy naphtha, North, 10½d. to 11d. Creosote, *ex* works, in bulk, North, liquid and salty, 2¼d. to 2¾d.; low gravity, 1¼d.; Scotland, 2¼d. to 2¾d. Heavy oils, in bulk, North, 4¾d. to 5¼d. Carbolic acid, 60's, 1s. 6½d. to 1s. 7d. Naphthalene, £9 to £10. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Sept.* 24.

Conditions remain rather dull in this area, but distillers are maintaining their quotations.

Crude gas-works tar.—Actual value is 47s. 6d. to 50s. per ton *ex* works.

Pitch.—Supplies being small, export value is nominal at 85s. to 90s. per ton f.o.b. Glasgow. Home price is steady at 90s. to 100s. per ton f.o.r. in bulk.

Refined tar to Ministry of Transport Specification is easy at 4d. to 4¼d. per gallon f.o.r. in buyers' packages.

Creosote oil.—While stocks remain quite low, values are stationary. B.E.S.A. Specification is 3½d. to 3¾d. per gallon; low gravity, 3¾d. to 4d. per gallon; and neutral oil, 3¾d. to 4d. per gallon—all *ex* works in bulk.

Cresylic acid continues without interest. Pale, 97/99 p.ct., is 1s. to 1s. 1d. per gallon; dark, 97/99 p.ct., 11d. to 1s. per gallon; and pale, 99/100 p.ct., 1s. 2d. to 1s. 3d. per gallon—all f.o.r. in buyers' packages.

Crude naphtha.—Available supplies are valued at 4½d. to 5d. per gallon, according to quantity and quality.

Solvent naphtha.—90/160 grade is 1s. 2d. to 1s. 3d. per gallon, and 90/190 grade 11d. to 1s. per gallon.

Motor benzole.—Inquiries are more numerous, but supplies are scarce. The value to-day is round 1s. 4d. to 1s. 5d. per gallon f.o.r. in bulk.

Pyridines.—90/160 grade is 3s. to 3s. 3d. per gallon, and 90/140 grade, 3s. 3d. to 3s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time.

	s. d.		s. d.	
Crude benzole	0 10½	to	0 11	per gallon at works
Motor ,, ...	1 6½	,,	1 7	,, ,, ,,
Pure ,, ...	1 10	,,	1 11	,, ,, ,,

Trade Notes.

Thirty Miles of Pipe a Week.

The Stanton Ironworks Company, Ltd., near Nottingham, announce on a recently issued leaflet that they can make immediate delivery of 3-in. and 4-in. diameter Stanton Delavaud spun-iron pipes, of which they are making thirty miles a week.

The British Exhibition in Copenhagen.

In connection with the Copenhagen British Exhibition, it is interesting to note that the London Electric Firm, of Brighton Road, South Croydon, Surrey, have supplied a large high-intensity searchlight projector to one of the leading Danish newspapers for display purposes, particularly during the period of the Exhibition.

Big Order for Morris-Commercials.

The Post Office Stores Department, who already have in service over 1000 Morris-Commercial vehicles, have just placed a further order with the Morris-Commercial Company for 173 vehicles. The new order is for eighty-five 15-cwt. vehicles and eighty-eight one-tonners, which will be put into service in various parts of the country.

Contracts Advertised To-Day.

Condenser.

The Gainsborough Gas Department invite tenders for the supply of a water tube condenser. [Advert. on Supplement XII.]

Gas Appliances.

The Dewsbury Corporation invite tenders for the supply of gas appliances. [Advert. on Supplement XII.]

Meters.

The Dewsbury Corporation invite tenders for the supply of gas meters. [Advert. on Supplement XII.]

Pipes, Specials, &c.

The Dewsbury Corporation invite tenders for the supply of the above. [Advert. on Supplement XII.]

Gas Acts (1920 and 1929) Orders.

Change of Calorific Value.

The Tottenham and District Gas Company give notice that as from Dec. 31, 1932, they intend to supply in the area of the Hoddesdon Gas and Coke Company, Ltd., gas of a calorific value of 500 B.Th.U. gross per c.ft. in place of the calorific value of 480 B.Th.U. at present being supplied within such area.

SPECIAL ORDERS.

Hampton Court Gas Company.

To empower the Company to grant pensions to their employees and to the widows, families, and dependents of such employees, and to establish and maintain a pension fund.

Altrincham Gas Company.

To authorize the Company to borrow on mortgage of their undertaking or by the creation and issue of debenture stock any amount not exceeding the aggregate amount of the paid-up share capital of the undertaking for the time being and of any premiums paid in respect thereof.

STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

[For Stock Market Report, see earlier pages.]

Issue	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Sept 24. (Provincial Exchange Sept. 23.	Rise or Fall on Week	Transactions. Lowest and Highest Prices During the Week.
£			% p.a.	% p.a.				
1,551,868	Stk.	Apl. 4	7½	7½	Alliance & Dublin Ord. ...	100—110	...	109½—109½
374,000	,,	July 4	4	4	Do. 4 p.c. Deb. ...	80—90	...	...
857,655	,,	Aug. 22	7	7	Barnet Ord. 7 p.c.	132—142	...	...
800,000	1	Apl. 29	1/4¹	1/9¼	Bombay, Ltd.	19/—21/-	...	20/9
177,750	Stk.	Aug. 22	9	9½	Bournemouth sliding scale	177—187	...	...
650,050	,,	,,	7	7	Do. 7 p.c. max. ...	135—145	+1	144—145
439,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	128—133	...	130—133
50,000	,,	June 20	3	3	Do. 3 p.c. Deb. ...	70—75	...	...
162,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	90—95	...	...
210,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	115—120	...	...
					Brighton, Hove, & Worthing			
357,900	,,	Aug. 22	7½	7½	6 p.c. Con. ...	135—145	...	...
540,000	,,	,,	6½	6½	Do. 5 p.c. Con.	120—130	...	...
195,500	,,	,,	6	6	Do. 6 p.c. B Pref.	127—132	...	136
1,387,500	,,	Aug. 8	5	5	Bristol 5 p.c. max.	106—107*a*	+½	...
120,420	,,	June 20	4	4	Do. 1st 4 p.c. Deb.	94—96*a*	...	...
317,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb.	93—95*a*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	115—120*a*	...	...
955,000	,,	Apl. 4	7	8	British Ord.	128—133	...	128—131
100,000	,,	June 20	7	7	Do. 7 p.c. Pref. ...	120—130	...	...
350,000	,,	—	—	—	Do. 5½ p.c. Pref.	107—112	...	108½
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	87—92	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb.	105—115	...	106 107
160,000	,,	July 4	5	5	Cambridge 5 p.c. Deb.	114—119	...	...
100,000	10	May 23	6	6	Cape Town, Ltd.	7¼—8¼	...	8
100,000	10	Apl. 29	4½	4½	Do. 4½ p.c. Pref. ...	6—7	...	...
150,000	Stk.	June 20	4½	4½	Do. 4½ p.c. Deb. ...	87—92	...	...
626,860	,,	Aug. 8	6	6	Cardiff Con. Ord.	102—107	...	...
237,860	,,	July 4	2½	5	Do. 5 p.c. Red. Deb.	105—110	...	...
157,150	,,	Aug. 8	6½	5	Chester 5 p.c. Ord.	89—94/-	...	...
98,936	1	May 23	2/-	2/-	Colombo, Ltd. Ord.... ...	26/—31/-	...	...
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	18/—20/-	...	...
609,204	1	Apl. 4	-/10'90	-/11'47	Colonial Gas Assn. Ltd. Ord.	10/—15/-	...	...
296,058	1	,,	1/2'54	1/3'30	Do. 8 p.c. Pref.	10/—15/-	...	...
2,079,280	Stk.	Aug. 8	5½	5	Commercial Ord.	102—107	...	104½—105½
475,000	,,	June 20	3	3	Do. 3 p.c. Deb. ...	70—75	...	...
807,560	,,	Aug. 8	7	7	Croydon sliding scale	130—140	...	131
469,690	,,	,,	5	5	Do. max. div.	95—100	...	95½—98½
500,000	,,	July 4	5	5	Do. 5 p.c. Deb.	115—120	...	...
542,270	,,	Aug. 8	10	7	Derby Con.	120—130*c*	...	...
55,000	,,	July 4	4	4	Do. 4 p.c. Deb.	75—85*c*	...	...
309,000	,,	Sept. 5	5	5	East Hull Ord. 5 p.c. ...	93—98*	...	...
179,500	,,	Aug. 22	5½	6	East Surrey Ord. 5 p.c. ...	108—118	...	...
155,019	,,	June 20	5	5	Do. 5 p.c. Deb. ...	114—119	...	...
1,009,180	,,	Mar. 14	†4	†6½	European, Ltd.	112—122	...	118—120
19,405,992	,,	Aug. 8	5½	5½	Gas Light & Coke 4 p.c. Ord.	22/—24/-*g*	...	22/6—23/7½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max. ...	77—82	...	77—77½
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	96—99	...	96½—98½
6,102,497	,,	June 20	3	3	Do. 3 p.c. Con. Deb. ...	75—78	...	...
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	110—113	+1	111—112
9,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	106—109	...	107—10-⅜
264,011	,,	Aug. 22	—	6	Harrogate New Cons. ...	104—109	...	...
82,500	,,	Aug. 22	7	7	Hastings & St. L. 5 p.c. Conv.	118—128	...	...
358,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	100—105	...	...
70,000	10	June 6	15	110	Hongkong & China, Ltd. ...	10—11	...	...
218,300	Stk.	Aug. 22	6	6	Hornsey Con. 3½ p.c. ...	103—108	...	...
5,600,000	,,	June 6	15	14	Imperial Continental Cap.	187—197	...	191—193½
228,130	,,	Aug. 8	3½	3½	Do. 3½ p.c. Red. Deb.	82—87	+1	86
335,242	,,	Aug. 8	8½	8½	Lea Bridge 5 p.c. Ord. ...	142—152	...	146½—147
9,145,907	,,	Aug. 22	6	6	Liverpool 5 p.c. Ord. ...	108—109*b*	...	...
245,500	,,	June 20	5	5	Do. 5 p.c. Red. Pref. ...	100—110*b*	...	...
806,083	,,	July 15	4	4	Do. 4 p.c. Deb. ...	85½—90½*b*	...	...
165,786	,,	Sept. 5	10	8	Maidstone 5 p.c. Cap. ...	150—160*	...	...
56,176	,,	June 20	3	3	Do. 3 p.c. Deb. ...	65—70	...	...
75,000	5	June 20	110	110	Malta & Mediterranean ...	7½—8½	...	8½
					Metropolitan (of Melbourne)			
392,000	—	Apl. 1	5½	5½	5½ p.c. Red. Deb.	95—100	...	...
171,978	Stk.	Sept. 5	5	5	M. S. D. Utility "C" Cons.	92—97	+6	...
718,687	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	80—85	...	...
118,126	,,	July 4	4	4	Do. 4 p.c. Deb. ...	87—92	...	...
148,955	,,	,,	5	5	Do. 5 p.c. Deb. ...	105—110	...	...
675,000	,,	21 May '31	16	16	Montevideo, Ltd.	40—60	...	...
2,061,315	,,	Aug. 8	5½	5	Newcastle & Gateshead Con.	20/—21/-*d*/	+/3	...
582,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	90—91*d*	...	...
691,705	,,	June 20	3½	3½	Do. 3½ p.c. Deb. ...	84—86*d*	...	...
377,385	,,	Apl. 29	5	5	Do. 5 p.c. Deb. '43...	105—110*d*	...	...
274,300	,,	Aug. 8	5	5	Newport (Mon.) 5 p.c. max.	86—88*a*	...	...
199,940	,,	Aug. 22	7½	7½	North Middlesex 6 p.c. Con.	135—145	...	...
896,160	,,	Aug. 8	5	5	Northampton 5 p.c. max. ...	88—93	...	92
300,000	,,	Apl. 18	9	7	Oriental, Ltd.	85—95	...	...
305,162	,,	June 20	8	8	Plym'th & Stonehouse 5 p.c.	140—150	...	149—149½
504,416	,,	Aug. 22	8	8	Portsm'th Con.Stk. 4 p.c.Std.	137—147	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	88—93	...	...
114,000	,,	Aug. 8	5	5	Preston 5 p.c. Pref. ...	100—105	...	...
686,812	,,	July 18	4	4	Primitiva 4 p.c. Rd. Db. 1911	75—80	...	76—77½
889,813	,,	June 20	4	4	Do. 4 p.c. Cons. Deb.	76—81	...	...
150,000	10	Sept. 19	6	6	San Paulo 6 p.c. Pref. ...	6½—7½*	—¼	...
1,786,968	Stk.	Sept. 5	6	6	Sheffield Cons.	108—112*e*	...	...
96,000	,,	July 18	4	4	Do. 4 p.c. Deb.	92—96*e*	...	...
188,201	,,	Sept. 5	5	5½	Shrewsbury 5 p.c. Ord. ...	108—113*	...	...
90,000	10	June 6	15	15	South African	4—6	...	...
6,709,895	Stk.	Aug. 8	7	5	South Met. Ord.	112—117	...	112—115
1,185,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	130—135	...	130—132
1,895,445	,,	July 4	3	3	Do. 3 p.c. Deb. ...	75—78	—1	...
1,000,000	,,	July 18	4	5	Do. 5 p.c. Red. Deb.	108—113	...	112½
91,500	,,	Aug. 8	8½	8½	South Shields Con.	130—131*d*	...	...
1,543,795	,,	Aug. 8	6	6	South Suburban Ord. 5 p.c.	110—116	...	112—113
300,000	,,	,,	5	5	Do. 5 p.c. Pref.	108—113	...	...
668,837	,,	June 20	5	5	Do. 5 p.c. Deb.	116—121	...	...
647,740	,,	Aug. 22	5	5	Southampt'n Ord. 5 p.c. max.	93—98	...	...
121,275	,,	June 20	4	4	Do. 4 p.c. Deb.	92—97	+4	...
200,000	,,	June 20	6½	6½	Swansea 6½ p.c. Red. Deb.	105—110	...	...
1,976,490	,,	Aug. 8	6½	6½	Tottenham and District Ord.	127—132	...	128—129½
300,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	112—117	...	...
199,005	,,	June 20	4	4	Do. 4 p.c. Deb. ...	91—96	...	...
85,701	,,	Sept. 19	6	6	Tuscan, Ltd., 6 p.c. Red. Db.	67—72*	—3	...
					Uxbridge, Maidenhead, &			
346,069	,,	Aug. 22	7	7	Wycombe 5 p.c.	128—133	...	...
88,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	107—112	+7	...
1,322,220	,,	July 4	7	7	Wandsworth Consolidated	130—140	...	135—136
971,373	,,	,,	5	5	Do. 5 p.c. Pref.	107—112	—1	107½—111
1,167,364	,,	June 20	5	5	Do. 5 p.c. Deb.	115—120	...	119
158,400	,,	Aug. 22	6*g*	5	Winchester W.& G.5p.c.Con.	98—103	...	...

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock. *g* Paid £3, including 10s. on account of back dividends. * Ex. div. † Paid free of income-tax. ‡ For year.

(This announcement is inserted gratuitously.)

PETER—WITH ONE EXCEPTION

With one exception Peter is an ordinary little fellow. Chubby, likeable, just five-and-a-half, full of life and fun and on occasions—be it admitted—of naughtiness.

Just now Peter's rather important, for this is his first term at school, and he's grappling with the intricacies of "A B C" and "Twice Two": difficult subjects to all men of five-and-a-half, but even more difficult in Peter's case because—bad luck—he's totally blind. That's his One Exception.

Peter learns reading, writing, and 'rithmetic through the medium of "Braille"—dull stuff compared with the coloured picture books of most five-and-a-halfs. However, he's a stout lad is Peter, and he's making great progress.

Would you like to know more about him? How, in spite of his "One Exception," he is being educated, and, when older, technically trained and usefully employed.

There is a long waiting list of "Peters" throughout the British Isles, for whom training and accommodation must be provided in the immediate future.

Will you help with a donation or annual subscription? Any sum, large or small, will be gratefully received.

Here's a suggestion. Your eyesight is worth 3d. a year to you. Send Peter and his handicapped pals 3d. for every year you've had it. Now, please, in case it slips your memory. Good idea!

THE CHAIRMAN,

SCHOOL FOR THE BLIND

(Founded 1838),

Swiss Cottage, LONDON, N.W. 3

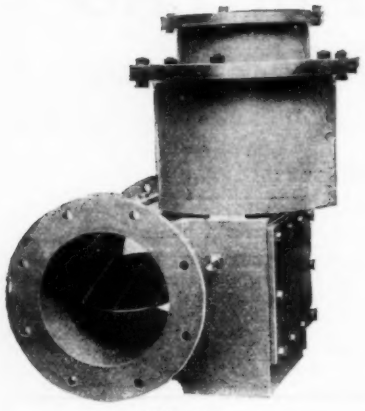


FIG. 38

Peebles

BUTTERFLY VALVE TYPE MERCURIAL DISTRICT GOVERNOR

FOR DISTRICT OR STATION GOVERNORS

This is a new design and meets the demands for a governor which will operate with minimum loss of pressure. The Butterfly Valve is mounted in ball bearings. The Valve casing can be short over flanges for insertion in main under pressure.

The Bell rod is tied to the Valve spindle, by Peebles' Patent frictionless flexible rope. Excellent results are obtained and less cleaning is necessary.

Full particulars from

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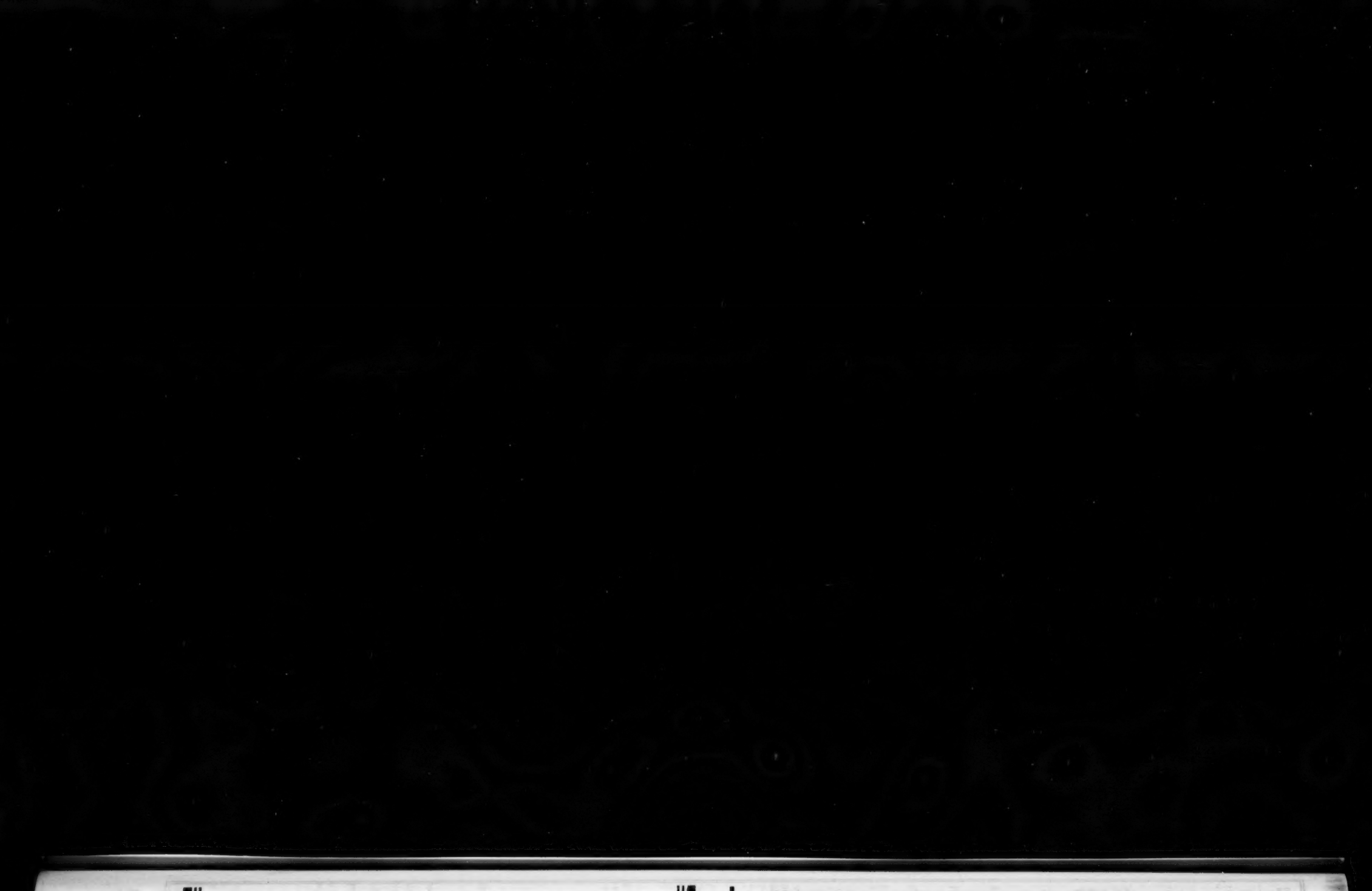
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